

Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 44.

September, 1942.

No. 525.

CONTRIBUTIONS FROM THE GRAY HERBARIUM OF
HARVARD UNIVERSITY—NO. CXLIV

CRITICAL NOTES ON CAREX

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(Plates 710–716)

While rewriting the treatment of *Carex* for a new edition of Gray's *Manual* so many points have arisen which need clarification that I am attempting their elucidation in the accompanying notes. Several more species need critical study, especially in the section *Vesicariae*; for instance, *C. vesicaria* itself. No one who has seen a good series of typical *C. vesicaria* of Europe can be at all satisfied with the reduction to it of all the diverse North American plants by Mackenzie in the North American Flora. These problems, temporarily interrupted, await further study. It seems desirable, however, to publish the notes on the genus already assembled.

It is to be regretted that it is not possible always to subscribe to the decisions and the splittings and reductions of Mackenzie. Suffering for many years from abnormal vision, he thought he saw, as I personally know from having shared a tent in Gaspé with him, what some others can not detect; and in his work upon the later groups in the North American Flora he had apparently lost his acuteness and "lumped" quite dissimilar plants. This failure in his latest work sharply to discriminate is well shown in his reduction of all variations of *C. inflata* (as *C. rostrata*) to one undivided maze (see PLATES 715 and 716). It is, obviously, unsafe to rely, without careful checking, upon all of

the specific treatments in *Carex*, as presented in the North American Flora.

CAREX DISTICHA IN NORTH AMERICA (PLATE 710, FIGS. 1-15). —*Carex disticha* Huds. Fl. Angl. 403 (1762) or *C. intermedia* Gooden. in Trans. Linn. Soc. ii. 154 (1794) is a variable species of Eurasia, so closely related to the North American *C. Sartwellii* Dew. in Am. Journ. Sci. xliii. 90 (1842) that difficulty has been encountered in separating the two. The common American plant has repeatedly been placed with it, sometimes as *C. disticha*, sometimes as *C. intermedia*, or as *C. disticha*, var. *Sartwellii* Dewey (1866). On the whole, however, the two can be rather readily recognized. *C. disticha* has the leaf-sheaths covering the nodes; in *C. Sartwellii* the upper nodes are exserted. In *C. disticha* the spikes are very unequal in size, oblong or narrowly ovoid, much longer than broad, the summit of the inflorescence continuous and more slender than the base and 2 or 3 cm. long; in *C. Sartwellii* the spikes are usually more uniform, small and globose to ovoid. The scales of *C. disticha* are castaneous, with pale hyaline margins, and acuminate; those of *C. Sartwellii* pale brown and blunter. The differences in the perigynia are not so pronounced as often stated but the prolonged beak in *C. disticha* is more sharply and deeply bidentate than in *C. Sartwellii*.

As to the name *C. disticha* Huds. (1762), Kükenthal, although so calling the plant in his introductory discussion in Das Pflanzenreich, Heft 38, iv²⁰. 5 and 9 (1909), rejected the name in his fuller treatment on p. 135, in favor of the later *C. intermedia* Good. (1794), citing in synonymy the *C. disticha* of Lamarck and others, "vix Huds." In view, however, of the unanimous retention of *C. disticha* Huds., with *C. intermedia* as a synonym, by the British botanists (Britten & Rendle in 1907; Druce in 1908; Wilmott in 1922), who should understand Hudson's species, I am returning to that long-used name.

My first object in the present note is to point out the occurrence in Ontario of *Carex disticha*. Its occurrence, possibly as an adventive from Europe, on the shores of the St. Lawrence at the Iles de Boucherville in Quebec, where discovered in 1927, has already been reported by Victorin in his Flore Laurentienne, 706 (1935). In the Gray Herbarium there is an additional Canadian specimen, correctly identified by the late William Boott, col-

lected by John Macoun on June 23, 1866, in a "peat bog near Belleville", Ontario. This material it seems to me is quite characteristic *C. disticha*. One of the inflorescences, $\times 1$, is shown in PLATE 710, FIG. 10, with a perigynium, $\times 5$, as FIG. 11. An inflorescence of the Boucherville plant, also $\times 1$, is shown as FIG. 12; while FIG. 13 is from the Vosges, France, *Raine*, and FIGS. 14 and 15 from Stockholm, *Ostman*. Although it is possible that the plant of the St. Lawrence at Boucherville, like some others which have recently established themselves near Montreal, may be a recent adventive, derived from straw and litter thrown out at the latter port, the fact, that in 1866 John Macoun collected the species in a natural bog near Belleville, suggests the desirability of watching carefully for it in that region, where it is probably indigenous.

In his treatment of *Carex Sartwellii* in the North American Flora, xviii¹. 37 (1931), Mackenzie, correctly citing Dewey's type as Sartwell material from Junius, Seneca County, New York, describes the perigynia as "ovate-orbicular, 2.5–3 mm. long, 1.5–1.75 mm. wide, . . . the body . . . abruptly contracted into a serrulate beak"; and Dr. F. J. Hermann, accepting without evident question Mackenzie's definition of the perigynium, described in 1938 a plant of Indiana as *C. Sartwellii*, var. *stenorrhyncha* F. J. Hermann in RHODORA, xl. 78 (1938) with gradually beaked elliptic perigynia 4–4.5 mm. long and 1–1.3 mm. broad, stating that the perigynia suggest those of *C. intermedia* (*C. disticha*) in length but not breadth, and in being "sessile to very short-stipitate," etc. I do not know how Mackenzie arrived at his statement of size (2.5–3 mm. long and 1.5–1.75 mm. wide) and the orbicular tendency in the perigynia of *C. Sartwellii*. Of the Sartwell collections which Dewey had there are 6 lots; in addition there are other collections from Junius, coll. *Sartwell*, in the Gray Herbarium, as well as others from Montezuma and from Buffalo. These are to me inseparable from the TYPE of var. *stenorrhyncha* and from many other collections of *C. Sartwellii* from farther west. FIG. 1 is an inflorescence, $\times 1$, of the Junius plant, coll. *Sartwell* and originally named by Dewey *C. Sartwellii*, later changed by him to *C. disticha*. FIG. 2 is an inflorescence, $\times 1$, from the TYPE of var. *stenorrhyncha*. The two look alike. FIG. 3 is a perigynium, $\times 5$,

3.5 mm. long and 1.4 mm. broad, from the Dewey (*Sartwell*) material; FIG. 4, another $\times 5$, 4.5 mm. long, also from Dewey (*Sartwell*) material; FIGS. 5 and 6 are two perigynia, $\times 5$, each 3–3.5 + mm. long, one 1.5 mm. broad, the other 1 mm. broad, from Montezuma, New York (*Eames, Randolph & Wiegand*, no. 11,575); FIG. 7 is a perigynium, $\times 5$, 4 mm. long and 1.5 mm. broad, from Port Huron, Michigan, *Dodge*, no. 52; FIG. 8, one, $\times 5$, 4.8 mm. long, from Grass Lake, Michigan, July 1, 1858, *Wm. Boott*; and FIG. 9 a perigynium, $\times 5$, from the TYPE of var. *stenorrhyncha*. I see no fundamental difference by which the latter can be set off; neither do I see the orbicular tendency in the perigynia nor that they are "abruptly contracted into a . . . beak".¹

C. INTERIOR Bailey, forma **keweenawensis** (F. J. Hermann), stat. nov. Var. *keweenawensis* F. J. Hermann in Am. Midl. Nat. xxv. 19 (1941).

Although Hermann surmised that his var. *keweenawensis* is a highly localized variety, endemic on the Keweenaw Peninsula, I am incapable of separating from his type scattered collections from throughout much of the range of the species (southern Labrador Peninsula, Newfoundland, Quebec, New York, Minnesota, Nebraska, British Columbia and California). The plant with inner face of the perigynium nerved, not otherwise different from the commoner plant with nerveless inner faces, seems to me a minor form, rather than a true geographic variety.

C. SCOPARIA Schkuhr, forma **subturbinata** (Fernald & Wiegand), stat. nov. Var. *subturbinata* Fernald & Wiegand in RHODORA, xiv. 116 (1912).

C. CRISTATELLA Britton, forma **catelliformis** (Farwell), stat. nov. Var. *catelliformis* Farwell in Papers Mich. Acad. ii. 17 (1923).

¹ Most unfortunately, quite similar inaccuracies in measurements pervade Mackenzie's work in the North American Flora. Those who rely upon them are bound to be seriously misled. In the species almost immediately following *C. Sartwellii* we find *C. grvida* defined with "head . . . 1–2.5 cm. long . . . ; perigynia 4 mm. long, 2 mm. wide", although specimens clearly marked by Mackenzie as *C. grvida* in the Gray Herbarium show heads more than 5 cm. long, and perigynia 5.5 mm. long and 3 mm. wide; while material identified by Mackenzie as his own *C. aggregata*, described as having "perigynia . . . 3.25–4.5 mm. long, about 2 mm. wide", shows plenty of them 5.5 mm. long and more than 3 mm. wide. Mackenzie, who essentially lost his eyesight in his later years, used to take pride in not needing a lens, for he had "microscopic vision". Possibly he overestimated the precision of his abnormal eyes. At least, one who has hoped to lean with assurance upon his measurements finds it unsafe to do so. It is necessary to start anew!

C. NORMALIS Mackenz., forma **perlonga** (Fernald), comb. nov. *C. mirabilis* Dewey, var. *perlonga* Fernald in Proc. Am. Acad. xxxvii. 473, t. 2, fig. 27 (1902). *C. straminea* Willd., var. *mirabilis* Tuckerm., forma *perlonga* (Fernald) Kükenthal in Engler, Pflanzenr. iv²⁰. 207 (1909). *C. normalis*, var. *perlonga* (Fernald) Burnham in Torrey, xix. 131 (1919).

Carex normalis, forma *perlonga*, occurring more or less throughout the range of typical *C. normalis*, is merely a form, but it is helpful to have a designation for it. In the typical form of the species the head is compact, 1.5–4 cm. long, made up of crowded to subapproximate spikes. In forma *perlonga* the spikes are all (or all but the terminal) remote in a flexuous, moniliform inflorescence 3–7 cm. long. Treated by Mackenzie (N. Am. Fl.) as of no consequence, plants of it with arching moniliform inflorescences 5–7 cm. long are bound to perplex those who attempt to reconcile it with his “erect head 2.5–5 cm. long.”

C. CUMULATA (Bailey) Mackenz., forma **soluta**, f. nov., inflorescentiis moniliformibus ad 1 dm. longis, spicis 0.7–2 cm. distantibus.—NOVA SCOTIA: sphagnous pool back of barrier beach near mouth of Broad River, Queens County, August 16, 1920, *Fernald & Bissell*, no. 20,311 (TYPE, in Herb. Gray.).

Typical *Carex cumulata* has the spikes approximate or densely crowded in a head 1–4.5 cm. long; but, while some heads of no. 20,311 are typical of the species, most of them are as prolonged and lax as in the most extreme specimens of *C. silicea* Olney. Although Mackenzie marked no. 20,311 as his *C. cumulata*, its moniliform heads up to 1 dm. long could not be identified by his key (N. Am. Fl.), “spikes . . . densely aggregated”, nor by his further definition of the species with “head 2–4 cm. long”. Forma *soluta*, however, has the characteristic loose sheaths, broad and stiff leaf-blades, conic-ovoid and truncate-based spikes which place it in *C. cumulata*; and the presence in the clumps of some typical condensed heads clearly show its specific identity.

C. HORMATHODES Fern., forma **invisa** (W. Boott), stat. nov. *C. straminea*, var. *invisa* W. Boott. in Bot. Gaz. ix. 86 (1884). *C. tenera*, var. *invisa* (W. Boott) Britton in Britt. & Brown, Ill. Fl. i. 358 (1896); Fernald in Proc. Am. Acad. xxxvii. 475, t. II, fig. 35 (1902). *C. hormathodes*, var. *invisa* (W. Boott) Fern. in RHODORA, viii. 166 (1906). *C. straminea*, var. *tenera*, forma *invisa* (W. Boott) Kükenth. in Engler, Pflanzenr. iv²⁰. 206 (1909).

Typical *C. hormathodes* is the larger extreme of the species,

0.2–9.5 dm. high, with spikes 8–15 mm. long and 5–9 mm. thick, the perigynia 4.8–6 mm. long. Forma *invisa* is the small extreme, mostly 1.5–3 dm. (sometimes –6 dm.) high, the spikes only 5–8 mm. long and 3–6 mm. thick, the perigynia only 4–5 mm. long. In both forms the head varies from moniliform and arching or flexuous to somewhat crowded and erect, and on late culms (second flowering), the spikes are often densely aggregated and increased in number, up to 15, instead of 3–9, as in the first inflorescences.

C. CARYOPHYLLEA A VALID NAME.—In recent years some continental Old World botanists have thrown aside the name *Carex caryophyllea* Latourrette, Chlor. Lugd. 27 (1785) in favor of *C. verna* Chaix in Villars, Hist. Pl. Dauph. i. 312 (1786) and ii. 204 (1787). Their argument was stated by Schinz & Thellung in their paragraphs in Vierteljahrss. Naturforsch. Gesellsch. Zurich, liii. Heft 4: 524 (1908):

Carex verna [Chaix in Vill. Hist. pl. Dauph. I (1786), 312 (“Hall. 1381”), nomen nudum] Vill. l. c. II. (1787), 204.

Carex caryophyllea Latourette [Chlor. Lugd. (1785), 27, nomen solum teste Hayek Sched. fl. stir. exs. 11/12 (1907), 5] ex A. et G. Syn. d. mitteleur. Fl. II, 2 p 123 (1902).

Schinz & Thellung quote Janchen to the effect that Latourrette cited as standing for his *Carex caryophyllea* “Haller nr. 1381,” exactly the same number which was first cited (in 1786) by Chaix in Villars in publishing *C. verna*, a publication which, in case of *C. verna*, they characterized as a *nomen nudum*, while of *C. caryophyllea*, published with the same citation, they said “nomen solum”. The International Rules of Botanical Nomenclature are as definite as rules can be which are stated as negations, that (Art. 37) “A name of a taxonomic group is not validly published unless it is . . . accompanied by a description of the group or by a reference to a previously and effectively published description of it” (italics mine); and, again (Art. 44) “The name of a species or of a subdivision of a species is not validly published unless it is accompanied (1) by a description of the group; or (2) by the citation of a previously and effectively published description of the group under another name; or (3) by a plate or figure with analyses showing essential characters; but this applies only to plates or figures published before January 1, 1908.”

Both Latourrette in 1785, in publishing *Carex caryophyllea*, and Chaix in 1786, in his first publication of *C. verna*, met the requirement by citing Haller's beautifully described no. 1381. Latourrette's very brief item, under *Carex*, was

Caryophyllea, N. Haller, 1381. Lugd. & Delph. [localities].

The almost as brief publication of *Carex verna* by Chaix in Villars (1786) was as follows, under *Carex*.

verna (mihi): Hall. 1381: passim in collibus apricis (4).

When the account of Haller in his Hist. Stirp. Helv. ii. 192 (1768) is looked up we find, as we have learned to expect from that great student, an account almost unequalled for clarity. Omitting his enumeration of specimens and a comment which does not bear on the immediate question, we have as diagnoses and citations the following:

1381. CAREX foliis cespitosis, brevibus, spicis confertis, petiolis erectis brevibus; capsulis ovato triquetris.†
Gramen caryophyllatae foliis, spica divulsa. C. B[auhlin].
Theatr. p. 46.

Cyperoides alpinum, Caryophyllatae foliis, spicis tenuibus, e fusco rufescentibus. SCHEUCHZER. p. 433.

Habitus caryophylleus. Folia cespitosa, breviter: firma, ad duas lineas lata, linea exarata, eminente nervo, retrorsum ducto digito aspera. Culmi trientales. Spicae in summa planta congestae. Mascula crassior, obesa, rufa, glumis cinnamomeis, nervo virescente divisis, ovatis. Feminae duae, tres, graciliores breviores, per maturitatem latescentes, capsulis hirsutis, ovato triquetris, absque rostro. Petiolus in ima spica aliquot linearum, suprema sessilis, marem contingit. Insident glumis aristatis.

What could better define *Carex caryophyllea*, a plant with short and firm, scabrous, spreading leaves (suggesting those of *Dianthus*), thick-clavate staminate spike with rufescent scales, and two or three pistillate spikes with hirsute trigonous-ovoid perigynia subtended by awn-tipped scales? These characters distinguish the species as usually defined. It is rarely that phytophraphers, from Linnaeus to our modern authors, give so lucid accounts of their species. There seems to be no ground for treating *C. caryophyllea* Latourrette as a "nomen" only, nor *C. verna* Chaix in Villars as a "nomen nudum".

Schinz & Thellung, von Hayek and others who have abandoned *Carex caryophyllea* presumably have done so because Haller's

descriptions were in a non-binomial work. The diagnoses and often the illustrations of Haller, like those of Scheuchzer, are superior. There seems to be no sufficient reason for not taking up binomials based upon Haller's descriptions, when those based upon Scheuchzer's are admitted, nor when so many of the Linnean genera and species rest wholly on earlier non-binomial accounts.

THE TYPE OF *CAREX UMBELLATA* (PLATE 710, FIGS. 16-25).—*Carex umbellata* Schkuhr ex Willd. Sp. Pl. iv. 290 (1805) and Riedgr. Nacht. 75, t. W w w, fig. 171 (1806) was clearly described with *ovate-lanceolate* pistillate scales about equaling the *ovoid*, beaked *perigynium*: "fructibus ovatis pubescentibus rostratis ore integris, squamam ovato-lanceolatam aequantibus" and again "Squamae ovato-lanceolatae membranaceae albae." Schkuhr's plate (our FIGS. 16, 17 and 25) clearly showed the ovoid and long-beaked perigynium and the acuminate-cuspidate ovate-lanceolate scale. Francis Boott correctly understood the plant when, in his Ill. Carex, ii. 99, t. 292 (1860), he illustrated the "squamae ovatae . . . vel lanceolatae, acuminato-cuspidatae" and the long-beaked perigynia (our FIG. 18). At the same time he described *C. umbellata*, var. *brevirostris* Boott, l. c. t. 294, with shorter-beaked and shorter obovoid perigynia and obtuse to merely acute broadly ovate scales: "perigyniis minoribus . . . obovatis . . . , rostro 2/10 lin. longo, . . . squama late ovata obtusa vel acuta . . . brevioribus." Boott's plate of var. *brevirostris* was clear. From it I have taken scales (reduced from the original) and perigynia (our FIGS. 19 and 20). Bailey and, later, I accepted Boott's decision and in 1913 in Bull. Torr. Bot. Cl. xl. 551 (1913) Mackenzie also did so; and in 1902 I described as *C. umbellata*, var. *tonsa* the glabrous-fruited plant which Boott had shown in his t. 293.

That the three are reasonably distinct species now seems apparent. The *narrow* (1.5-3 mm. broad)- and relatively soft-leaved plant, true *C. umbellata* Schkuhr, with *pistillate scales lance-ovate and gradually tapering to long or acuminate tips*, has the finely *pubescent perigynia 3.2-4.7 mm. long, with ellipsoid-ovoid or -obovoid body 1.25-2.2 mm. thick, the beak 0.9-1.7 mm. long*. The *narrow- and softer-leaved plant with scales ovate or ovate-oblong and short-tipped*, the *perigynia 2.2-3.3 mm. long*,

with globose-obovoid bodies 1–1.3 mm. thick, the beak only 0.5–1 mm. long, is *C. abdita* Bicknell in Bull. Torr. Bot. Cl. xxxv. 492 (1908) = *C. umbellata*, var. *brevirostris* Boott. The coarser plant, with hard and firm erect leaves becoming 2.5–5 mm. broad, the large and long-beaked perigynia essentially glabrous, is *C. tonsa* (Fern.) Bicknell, l. c. = *C. umbellata*, var. *tonsa* Fern.

This interpretation of *C. umbellata* was the unanimous one until, in Bull. Torr. Bot. Cl. xlii. 621 (1915), Mackenzie wrote: "A careful study of Schkuhr's plate of *Carex umbellata* has thoroughly convinced me that what he had was a plant with short-beaked perigynia, named *C. abdita* by Bicknell." Consequently Mackenzie gave to his correct *C. umbellata* of his treatment of 1913, the plant with "scales lance-ovate, short-cuspidate to acuminate, . . . perigynia 3.25–4.25 mm. long, the body short-oval", etc., the new name *C. rugosperma*; and those botanists who indiscriminately think that the "last word" is necessarily the best have forthwith taken up *C. rugosperma*.

In the North American Flora, xviii⁴. 204, 205 (1935), therefore, Mackenzie treats as *C. umbellata* the smaller and softer plant, *C. abdita* Bicknell, with "scales ovate, abruptly acute, acuminate or cuspidate, . . . perigynia 2.25–3.25 mm. long, the body subglobose, . . . 1–1.25 mm. wide, . . . abruptly contracted into a short (0.5–1 mm. long) beak"; and at the same time he maintained his *C. rugosperma* for the plant with lance-ovate and acuminate scales and with larger and longer-beaked perigynia with the body "short-oval."

If one compares the illustrations of perigynia and pistillate scales in Mackenzie's North American Cariceae, i. pl. 234, of *Carex* "*umbellata*" sensu Mackenzie or *C. abdita* Bicknell (our FIGS. 21 and 22) and those of his *C. rugosperma*, the *C. umbellata* of Boott, Bailey, Fernald and in 1913 of Mackenzie (our FIGS. 23 and 24) and then takes into account the fact that the very long beak in Mackenzie's plate of the latter (his pl. 235) is very extreme (the beak commonly much shorter than there shown), it will be apparent that the shape of the scale and of the perigynium-body of true (Schkuhr's) *C. umbellata* (our FIGS. 16 and 17) are much closer to those of *C. rugosperma* (our FIG. 18) than to those of *C. "umbellata"* sensu Mackenzie, not Schkuhr (our FIGS. 19–22). The original description of Schkuhr ex Willdenow

clearly defined the perigynia as ovate, the scales as ovate-lanceolate; for his *C. "umbellata"* Mackenzie as definitely says, body of perigynium "subglobose", the "scales ovate". In view of these facts I find myself reducing *C. rugosperma* to *C. umbellata* Schkuhr. When one considers the interchangeable character of the scale, in Schkuhr's original *C. umbellata* "ovate-lanceolate", in Mackenzie's *C. rugosperma* "lance-ovate", he is reminded (if he ever reads such nonsense) of one of the scaly characters of Stephen Leacock, who imagined that he had altered his identity by reversing his name from Vere de Lancy to Lancy de Vere and so far succeeded that his original name was unknown on shipboard except by "the captain, the purser, the steward, and the passengers".

A life-size photograph of Schkuhr's type, secured by Dr. Svenson, who kindly presented the Gray Herbarium with a copy, shows the prolonged-acuminate scales of *C. rugosperma* and should dispose of the doubts of those who take Mackenzie's verdicts as law. Unfortunately, the prints, sent from Halle without the negative, are too black for reproduction.

As to *Carex umbellata*, var. *vicina* Dewey, which in the North American Flora Mackenzie places in the synonymy of his *C. "umbellata"* (i. e. *C. abdita*), it should be noted that Dewey's type belongs in true *C. umbellata* Schkuhr (*C. rugosperma* Mackenzie).

C. RICHARDSONII R. Br., forma **exserta**, f. nov., spicis foemineis valde exsertis pedunculis imis 1.8–3.3 cm. longis. ILLINOIS: Augusta, *S. B. Mead*, in Herb. Gray.

Typical and widespread *Carex Richardsonii* has the bases of the pistillate spikes included in or barely exserted from the colored sheaths. In restudying the species I had marked fig. 475 in Gray, Man. ed. 7, 240 as "impossible"; but search of the material in the Gray Herbarium reveals the wholly unusual sheet of the formerly unrecognized forma *exserta* as having been used as the basis for fig. 475 in the Manual. Fig. 475, then, is a good illustration of forma *exserta*, not of typical *C. Richardsonii*.

CAREX terrae-novae, sp. nov. (TAB. 711, FIG. 1, 3, 4, 7, 8), *C. glaciali* habitu simillima; vaginis inferioribus plerumque pallide brunneis; culmis 1–12 cm. altis; bracteis spathiformibus; spicis foemineis sessilibus vel subsessilibus densifloris, rhachi recti glabro; squamis caducis; perigyniis anguste ovoideo-

ellipsoideis fusiformibus 2–2.5 mm. longis, basi angustatis sub-stipitatis, rostro 0.3–0.5 mm. longo.—Calcareous barrens of northern and western NEWFOUNDLAND: turfy slopes of slaty hills, Little Quirpon, August 6, 1925, *Fernald & Long*, no. 27,658; dry limestone barrens, northern half of Burnt Cape, Pistolet Bay, July 17, 1925, *Fernald et al.*, no. 27,655; sandy and clayey spots in limestone gravel-barrens, Boat Harbor, Straits of Belle Isle, *Fernald, Wiegand & Long*, no. 27,656; gravelly and peaty limestone barrens back of Big Brook, Straits of Belle Isle, July 15, 1925, *Fernald & Long*, no. 27,652; limestone barrens west of Big Brook, July 16, 1925, *Long & Gilbert*, no. 27,653; limestone barrens on the Highlands northeast of Big Brook, *Fernald, Wiegand & Hotchkiss*, no. 27,654; dry gravelly limestone barrens, Savage Point, Straits of Belle Isle, July 13, 1925, *Fernald et al.*, no. 27,650; dry horizontal limestone, Rock Marsh, Flower Cove, Straits of Belle Isle, July 30, 1924, *Fernald, Long & Dunbar*, no. 26,428; limestone barrens near Ice Point, St. Barbe Bay, July 14, 1925, *Wiegand, Gilbert & Hotchkiss*, no. 27,651; damp clay pockets in limestone gravel, Brig Bay, August 6, 1924, *Fernald, Long & Dunbar*, no. 26,429; forming close turf in peaty pockets in limestone ledges, Plum Point, Brig Bay, August 8, 1924, *Fernald, Long & Dunbar*, no. 26,430; dry gravelly limestone barrens, St. John Island, St. John Bay, July 31, 1925, *Fernald, Wiegand, Long, Gilbert & Hotchkiss*, no. 27,657 (TYPE in Herb. Gray.); gravelly crests of limestone sea-cliffs at base of Pointe Riche, July 22, 1929, *Fernald, Long & Fogg*, no. 1411; dry gravelly limestone barrens, Pointe Riche, July 24, 1929, *Fernald, Long & Fogg*, no. 1412; dry limestone barrens, upper slopes and tablelands, altitude 200–300 m., Table Mountain, Port au Port Bay, August 16, 1910, *Fernald, Wiegand & Kittredge*, no. 2894; dry exposed ledges and shingle on the limestone tableland, alt. 200–300 m., Table Mountain, July 16 and 17, 1914, *Fernald & St. John*, no. 10,796; summit of 1st dome, Table Mountain, July 24, 1921, *Mackenzie & Griscom*, no. 10,147; dry limestone barrens, Green Gardens, Cape St. George, July 18, 1922, *Mackenzie & Griscom*, no. 11,022.

The earliest collections were distributed as *Carex pedata* Wahlenb., all the others as *C. glacialis* Mackenzie; the latter name published by Mackenzie in Bull. Torr. Bot. Cl. xxxvii. 244 (1910) for *C. pedata* Wahlenb. (1812), not L. (1763), with reference only to the European plant. In the North American Flora, xviii⁴. 221, Mackenzie treats the Newfoundland plant, along with that of Greenland, Ellesmereland, Mackenzie and Yukon, as identical with the arctic-alpine European species; but the plant of Newfoundland differs in so many characters that I find it very

difficult to consider it as belonging to *C. glacialis* (*C. pedata* Wahlenb.). The plant of Greenland, and Ellesmereland, thence west across Arctic America and south to Baffin Island (*Malte, Polunin*), Cape Mugford, Labrador (*Potter & Brierly*, nos. 2389 and 2390) and Lake Athabasca, Saskatchewan (*Raup*, no. 6521), seems to be very characteristic *C. glacialis*; the Newfoundland plant as clearly not.

Carex glacialis (*C. pedata* Wahlenb.) usually (but not always) has the bases purplish ("vaginae inferiores purpureae"—Kükenthal); *C. terrae-novae* very rarely so, the lowest sheaths being drab or pale brown in most cases, only 4 out of the 18 collections at hand showing a slight purplish tone. The lower bract of *C. glacialis* is subtruncate and usually ends in a slender but short hirtellous blade (FIG. 2), ("Bracteae ad vaginas breves truncatas coloratas reductae, ima plerumque lamina brevi setacea munita"—Kükenthal); in *C. terrae-novae* the lower bract (FIGS. 3 and 4) is obliquely sheathing, much more scarious than in *C. glacialis*, and its very exceptional minute blade is smoother. In well developed *C. glacialis* the lower spike is clearly peduncled (FIG. 2), standing definitely out of the truncate bract, but in the most dwarfed extremes it may be subsessile; in *C. terrae-novae* (FIGS. 1 and 3) it is sessile or barely short-peduncled. The pistillate spikes of *C. glacialis* are lax and open, with a flexuous and hirtellous rachis ("spicis subpedunculatis sparsifloris"—Wahlenberg; "laxe 2-5-florae . . . rhachis flexuosa"—Kükenthal); in *C. terrae-novae* the pistillate spikes (FIGS. 3 and 4) are densely few-flowered, the straight and smooth rachis usually hidden by the imbricated perigynia. In *C. glacialis* the perigynia promptly fall, leaving the flexuous rachis clothed with the persistent and distant scales; in *C. terrae-novae* the pistillate scales are caducous, leaving the rachis covered by sub-persistent imbricated perigynia. In *C. glacialis* the perigynia (FIGS. 5 and 6) are broadly obovoid and only slightly narrowed at base, 2 mm. long, with a relatively short beak with oblique orifice, and slightly persistent style-base ("capsulis subglobosis apiculatis"—Wahlenberg; "Utriculi . . . orbiculato-ovati . . . 2 mm. longi . . . , basi contracti, apice in rostrum breve . . . saepe obliquum ore hyalino . . . abrupte abeuntes"—Kükenthal); in *C. terrae-novae* the more slender perigynia (FIGS. 7 and 8) are 2-2.5 mm.

long, tapering to a substipitate slender base and to a longer beak with subtruncate orifice. In *C. terrae-novae*, furthermore, the styles (FIG. 8) are apparently longer and their indurated bases more regularly persistent in the fruit.

Whether the staminate scales and the anthers of *Carex terrae-novae* differ materially from those of *C. glacialis* I cannot yet determine. The material is all past flowering.

C. PALEACEA Wahlenb., forma **erectiuscula** (Fernald), comb. nov. *C. maritima*, var. *erectiuscula* Fernald in RHODORA, ii. 170 (1900).

Since the familiar name, *Carex maritima* O. F. Muell. (1777), is antedated by *C. maritima* Gunner (1772) we have to take up for the maritime member of *Carex*, § *Cryptocarpae*, the name *C. paleacea* Wahlenb. in Svensk. Vet.-Akad. Nya Handl. xxiv. 164 (1803). In RHODORA, xxxv. 397 (1933) I most stupidly assumed (and consequently reaped the almost certain reward for so doing) that Wahlenberg's plant was the Scandinavian form of the species, there with tendencies to smaller parts (stature, leaf-breadth, size of spikes, length of beak, etc.) than the American plant (eastern Labrador to the lower St. Lawrence, south to Massachusetts; and shores of James Bay). I, consequently, too hurriedly named our American plant *C. paleacea*, var. *transatlantica*. Sad to confess, the type of *C. paleacea* Wahlenberg was the American plant. Wahlenberg took it to be a distinct species from the Scandinavian *C. maritima* of O. F. Mueller, describing the two, one after the other on the same page. Wahlenberg supposed his *C. paleacea* to be "*C. paleacea* SCHREB. in *Mühlenb. Act. Amer?*" and its habitat was given as simply: "*Hab. in America boreali; secundum herbarium Cl. Torneri*". A beautiful photograph of the TYPE, most generously sent me by Professor Alm in December, 1934, when he graciously pointed out my inexcusable blunder, shows the smallest northern extreme of our coastwise plant, such as occurs chiefly at the northern limit of the specific range with us. It presumably came from the Labrador Peninsula.

Mackenzie explicitly says in N. Am. Fl. xviii.⁷ 414, "Type from Greenland". In view of the Scandinavian authorship of the species this was a plausible assumption but there is nothing in Wahlenberg's "*Hab. in America boreali*" to support it. The

species was not included by Lange in his compendious works on the Greenland flora; neither is it in Ostenfeld's *Flora Arctica*, nor in his detailed enumeration of all known plants of Greenland; nor did Polunin find any evidence of it in the Canadian Eastern Arctic. In the Gray Herbarium there is an old specimen labeled in the hand of someone else: "legit Vahl. e Groenlandia", but it can hardly be taken, in view of the failure of the closest students of the Greenland flora to find it, as evidence that the type of *C. paleacea*, communicated by Torner as from North America, came from Greenland.

As to "*C. paleacea* SCHREB. in *Mühlenb. Act. Amer?*", Wahlenberg doubtless meant *C. paleacea* Schreber ex Muhl. in *Trans. Amer. Phil. Soc.* iii. 179 (1793). This, merely a *nomen*, did not get recorded in *Index Kewensis*. It was in Muhlenberg's (Muhlenberg then and thereafter used the unmodified u, not ü, in his name) *Index Florae Lancastriensis*. It was an undescribed species of Schreber, with whom Muhlenberg was in regular correspondence, but, published simply as "*Carex*, Seg [Sedge] *paleacea*, Schreberi, N. S.", it can be treated only as a *nomen nudum*. Dewey and others took up Wahlenberg's *C. paleacea* as based upon the Lancaster (Pennsylvania) plant and Dewey made a varietal combination, *C. crinita*, β . *paleacea* (Wahlenb.) Dew. in *Am. Journ. Sci.* x. 270 (1826); but, as above indicated, the Wahlenberg TYPE is conspecific with *C. maritima* O. F. Muell.

Forma erectiuscula was thought by me in 1933 to be a possible hybrid of *Carex paleacea* and *C. salina*, var. *kattegatensis*. There is such a hybrid but the type and several other collections (from Anticosti and the coast of Maine) show no traces of the latter plant. They seem to be an extreme of *C. paleacea* with very short and short-peduncled erect pistillate spikes. In this character they break down the statements in familiar keys. For example, Mackenzie's key says of *C. paleacea* "lower spikes normally pendulous"; "commonly" would have been better.

As to the keys in Kükenthal's treatment of § *Cryptocarpae*, they throw one into the hopeless despair suffered so frequently in trying to follow *Das Pflanzenreich*. Stoloniferous and halophytic *C. maritima* (*C. paleacea*) is there separated from its halophytic and stoloniferous allies (*C. salina*, *C. Lyngbyei*, etc.), with which it hybridizes, and is put with *C. crinita*, to which it has no close

relationship. *C. salina* is distinguished in his key by "Culmus 10–30 cm altus . . . Spiculae ♀ 3–4 mm late erectae. Squamae . . . aristatae vel mucronatae". Nevertheless, under the fuller treatment of *C. salina* and its varieties and forms we get "Culmus validus 60–90 cm. altus"; "Spiculae ♀ . . . longe capillari-pedunculatae pendulae"; "Spiculae ad . . . 1 cm latae"; and "Squamae ♀ obtuse". It is not remarkable that students become confused in trying to use the treatments!

CAREX AQUATILIS Wahlenb., var. **altior** (Rydb.), comb. nov. *C. variabilis* Bailey, var. *altior* Rydb. in Mem. N. Y. Bot. Gard. i. 76 (1900). *C. variabilis*, var. *elatio* Bailey in Mem. Torr. Bot. Cl. i. 19 (1889), not *C. aquatilis*, var. *elatio* Bab. Man. 341 (1843). *C. aquatilis*, var. *substricta* Kükenthal in Engler, Pflanzenr. iv²⁰. 309 (1909). *C. substricta* (Kükenth.) Mackenz. in Rydb. Fl. Rocky Mts. 139 (1918), in N. Am. Fl. xviii.⁷ 398 (1935) and N. Am. Cariceae, ii. pl. 458 (1940). PLATE 712, FIGS. 1–3 and 5–7.

Typical *Carex aquatilis* of Scandinavia (perigynium, $\times 10$, in FIG. 4) and other parts of northern Eurasia has the culms, to quote Kükenthal, obtusely angled and smooth (Culmus . . . obtusangulus laevis). Examination of some scores of Old World sheets shows this to be the case. In its dwarf northernmost extreme this character holds, as does the elliptic to elliptic-obovate nerveless perigynium, the more northern and low plants sometimes separated as var. *stans* (Drejer) Boott, or even as a species, *C. stans* Drejer. The latter seems to be only a dwarfed state and hardly worth varietal or even formal recognition. *C. aquatilis* in North America is common from the Arctic southward to exposed areas of Newfoundland, the tablelands of Cape Breton, the Gaspé Peninsula, shores of James Bay, and along the Cordillera to New Mexico and California. In the southern part of its range, from Newfoundland to British Columbia, south to Nova Scotia, northern and western New England, northern New Jersey, New York, Ohio, Indiana, Wisconsin, Missouri, Nebraska, Colorado and Oregon, it is gradually replaced by a coarser extreme (sometimes up to 1.5 m. high), with broader leaves, longer spikes (up to 10 cm. long and 3–7 mm. thick), the perigynia more broadly ovate to obovate, with rounded summits and usually obscurely nerved. The upper 1–3 decimeters of the relatively slender and firm culm of this southern extreme are

acutely angled and either smooth or scabrous. This is *C. substricta* (Kükenthal) Mackenzie. Upon the not too constant shape of the perigynium *C. aquatilis* and *C. substricta* are separated thus in the North American Flora:

“Perigynium narrowly to very broadly elliptic, broadest below apex, less than 3 mm. long, 1–1.5 mm. wide. . . . 457. *C. aquatilis*.
Perigynia strongly obovate, broadest at the apex, 3 mm. long, 1.75 mm. wide. . . . 458. *C. substricta*.”

Mackenzie cites *C. aquatilis* as extending south in the East only to Quebec (the Gaspé Peninsula), while the only material of the group recognized by him from Maine is his *C. substricta*. It is, therefore, unfortunate that, in an attempt to display the “specific” difference in the perigynia, he should have selected for illustration of the boreal *C. aquatilis* a specimen from central Maine at an altitude of about 100 feet (Orono, Fernald, July 9, 1900), for the Orono plant, 1.5 m. high and with thick pistillate spikes 3–7 cm. long (for *C. aquatilis* Mackenzie says 1–4 cm.) is the best kind of *C. substricta*! The result is that Mackenzie’s illustration of the perigynium, made from a large specimen of *C. substricta*, shows an obovate perigynium, not an elliptic one as demanded by his key for *C. aquatilis*.

It is unfortunate also that Kükenthal’s *C. aquatilis*, var. *substricta*, the basis of Mackenzie’s specific name, should be cited by Mackenzie in the North American Flora (pp. 397 and 398) in the synonymy of both *C. substricta* and *C. aquatilis*. Cited as a pure synonym of *C. aquatilis* it had its “Type from eastern North America”; cited as the basis of *C. substricta* it was designated as having its “Type probably from Junius, Seneca County, New York”. Kükenthal had given the range, without designated type “Atlantisches Nordamerika: Newfoundland; Canada bis Assiniboia (J. Macoun n. 16687!); Vereinigte Staaten nur im Nordosten, von Maine and Vermont (Pringle!) bis New York (Sartwell n. 56!), Pennsylvanien, Ohio and Minnesota”. Since Mackenzie has chosen as type Sartwell’s no. 56, that may stand as the type; but his “probably from Junius” suggests that Mackenzie did not take the trouble to look up no. 56. This was, of course, in the usually well known 2-volume *Carices Americae Septentrionalis Exsiccatae*, edidit H. P. SARTWELL, M.D. Penn Yan, Nov. Ebor. Pars I, 1848, Pars II, 1850. No. 56, with the regular printed label, says “Junius, New York”;

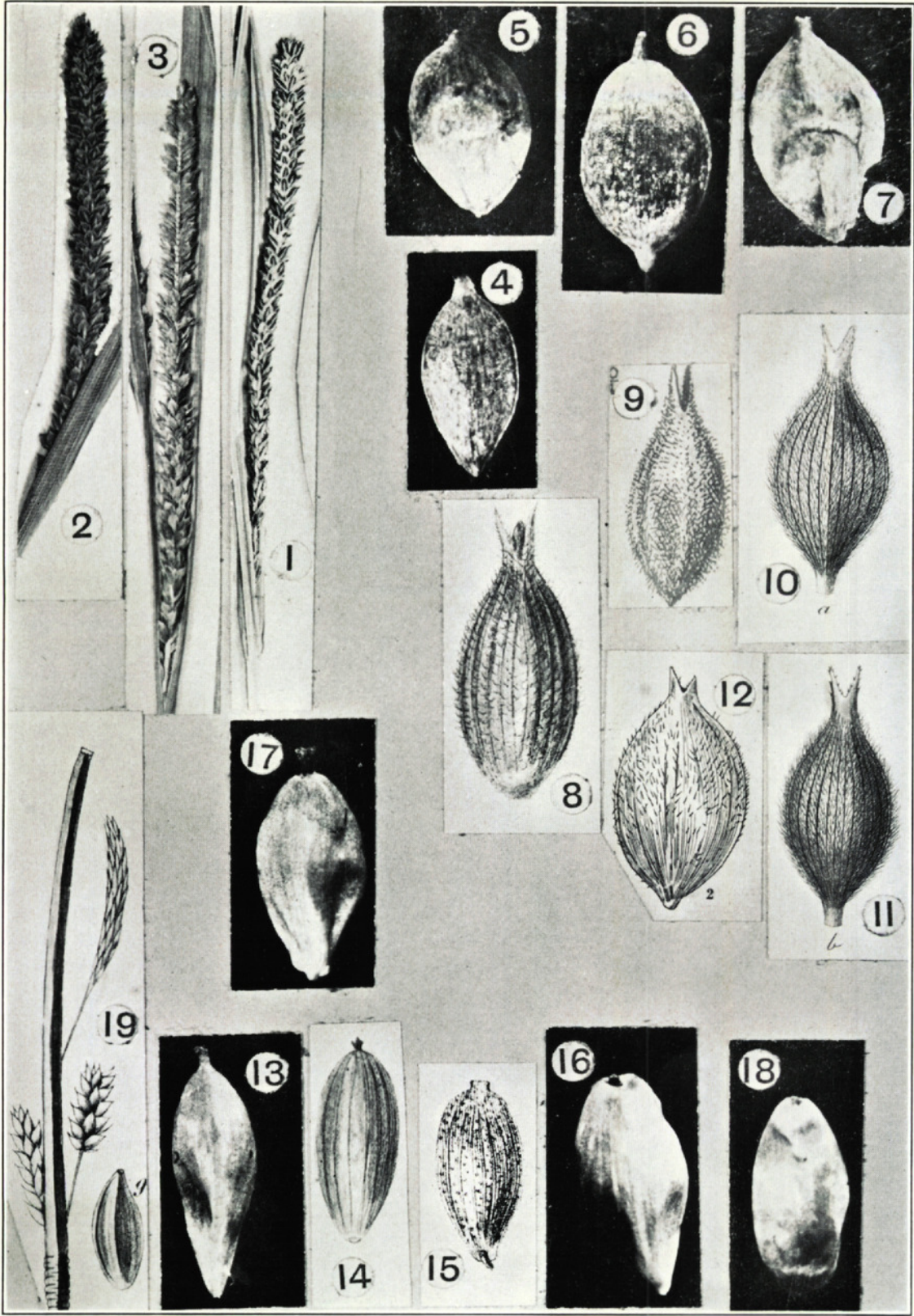


Photo. B. G. Schubert.

FIG. 4, typical *CAREX AQUATILIS*: perigynium, $\times 10$, from Lapland. FIGS. 1-3 and 5-7, var. *ALTIOR*: FIG. 1, pistillate spike, $\times 1$, from TYPE; FIG. 2, pistillate spike, $\times 1$, from ISOTYPE of *C. substricta*; FIG. 3, pistillate spike, $\times 1$, from topotype of *C. substricta*; FIGS. 5-7, perigynia, $\times 10$, from spikes shown in FIGS. 1-3 respectively.

FIGS. 8-12, *C. LASIOCARPA*: FIG. 8, perigynium of European type, after Lindman; FIG. 9, perigynium of European type, after Host; FIGS. 10 and 11, perigynia of var. *AMERICANA*, after Boott; FIG. 12, perigynium of var. *OCCALTANS*, after Akigama.

FIGS. 13-19, *C. PALLESCENS*: FIGS. 13-15 and 19, typical European plant: FIG. 19, inflorescence and perigynium of *C. undulata* Kunze, after Kunze; FIG. 13, perigynium, $\times 10$; FIG. 14, perigynium, after Host, FIG. 15, after Boott. FIGS. 16-18, perigynia, $\times 10$ of var. *NEOGAEA*.

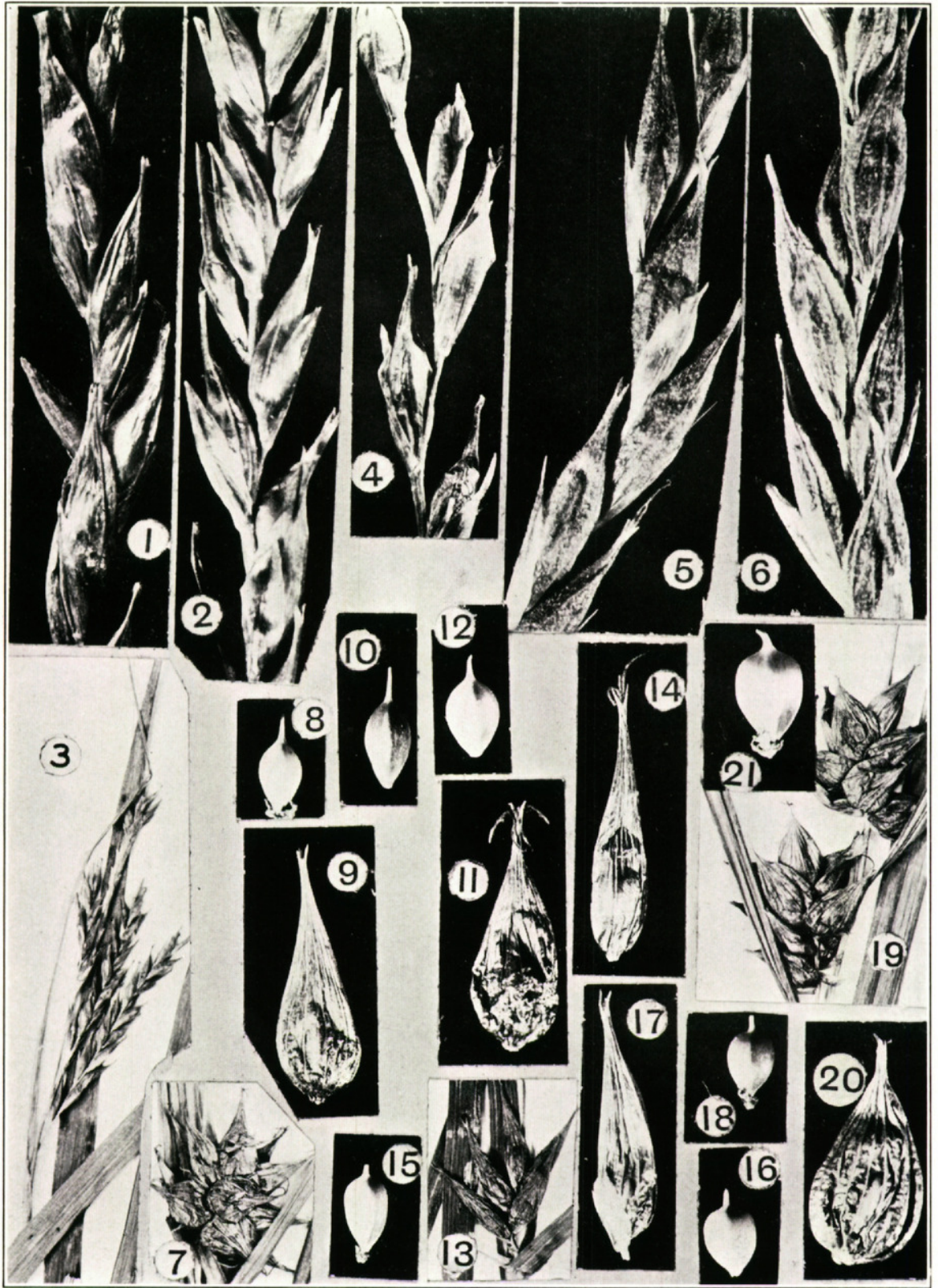


Photo. B. G. Schubert.

FIGS. 1-6, pistillate spikes of varieties of *CAREX DEBILIS*, $\times 5$ (FIG. 3, $\times 1$): FIG. 1, var. *TYPICA*; FIG. 2, var. *RUDGEI*; FIG. 3, var. *STRICTIOR*; FIG. 4, var. *INTERJECTA*; FIG. 5, var. *PUBERA*; FIG. 6, var. *INTERCURSA*.

FIGS. 7-21, *C. INTUMESCENS*: FIGS. 7-12, typical *C. INTUMESCENS*: FIG. 7, pistillate spike, $\times 1$; FIGS. 8, 10 and 12, achenes, $\times 2$; FIGS. 9 and 11, perigynia, $\times 2$. FIGS. 13-18, var. *FERNALDII*: FIG. 13, pistillate spike, $\times 1$, from TYPE; FIGS. 14 and 17, perigynia, $\times 2$; FIGS. 15, 16 and 18, achenes, $\times 2$. FIGS. 19-21, var. *FERNALDII*, forma *VENTRIOSA*, all from TYPE: FIG. 19, pistillate spikes, $\times 1$; FIG. 20, perigynium, $\times 2$; FIG. 21, achene, $\times 2$.

there is no "probably"; and of course Sartwell knew his own country.

It is natural that Mackenzie should have been confused in separating as species his *C. substricta* and the more boreal *C. aquatilis*. Everyone who faces a stack (in my case a stack 2 feet high) of specimens is bound to become confused in attempting to sort them. So long as one deals only with the plant of the Arctic and Subarctic, extending down to Newfoundland and Gaspé and along the mountains in the West, as contrasted with those from New England to southern Manitoba and Missouri, he is on fairly clear ground. When he tackles the transition areas, however, the characters become hopelessly confused. The material from northern Alberta to Colorado is particularly difficult to sort into two exclusive piles. In that area Mackenzie's policy of placing Kükenthal's *Carex aquatilis*, var. *substricta* under two species was partly justified.

On the whole, however, the large temperate American series with the culms acute-angled above, with broader leaves, longer spikes and more obovate and often nerved perigynia, stands off as a good geographic variety—that is all. It was clearly described in 1889 as *C. variabilis* Bailey, var. *elator* Bailey in Mem. Torr. Bot. Cl. i. 19 (1889). At that time Bailey proposed for the Rocky Mountain representatives of *C. aquatilis* a species which he called *C. variabilis*, *ibid.* 18, differing from *C. aquatilis* in having "culm sharply angled, roughish on the angles", etc.; and for the taller extreme, "much taller", with "spikes often 3 to 4 inches [7.6–10.1 cm.] long", he proposed *C. variabilis*, var. *elator*. Under the latter he cited three specimens: "Canon City, Colorado, Brandegee; open thickets, Morley 'Foot-hills of Rocky Mts', and Donald, Columbia Valley, B. C. Macoun". In the North American Flora, where his *C. substricta*, with "sharply triangular" culms "smooth or roughened above" with spikes "usually 3–6 cm. long", is distinguished from his *C. aquatilis*, with culms "obtusely triangular below . . . smooth throughout or somewhat roughened above", and with spikes only "1–4 cm. long", Mackenzie places without question *C. variabilis*, var. *elator* in the synonymy of true *C. aquatilis*. He there designates as type of Bailey's var. *elator* the Brandegee specimen from Canon City. This, clearly marked by Bailey, is

in the Gray Herbarium. With its firm and slender culms acutely angled and scabrous and its spikes (FIG. 1) up to 7 cm. long it is to me inseparable from much slender-spiked *C. substricta*, for instance an isotype (Sartwell, no. 56 our FIG. 2) in the Gray Herbarium and a topotype (Wiegand, no. 1842, our FIG. 3), the former with the lowest spike 6 cm. long, the latter with it 7.5 cm. long. Strikingly enough the perigynium (FIG. 5, $\times 10$) of the Canon City TYPE of *C. variabilis*, var. *elator* is fully as rounded-ovate (Mackenzie says obovate) as in Sartwell, no. 56 (FIG. 6, $\times 10$), isotype, and in Wiegand, no. 1842 (FIG. 7, $\times 10$), topotype of *C. substricta*. There seems to me no question that *C. aquatilis*, var. *substricta* (1909) and *C. variabilis*, var. *elator* (1889) belong together. Since, however, there is a *C. aquatilis* var. *elator* Bab. (1843), a European variety with culms and perigynia of true *C. aquatilis*, it is necessary to take up the name *C. aquatilis*, var. *altior*, based on *C. variabilis*, var. *altior* Rydb. (1900), a substitute for Bailey's var. *elator* and resting, for typification, upon it.

C. BIGELOWII Torr., forma **anguillata** (Drejer), comb. nov. *C. anguillata* Drejer, Nat. Tidskr. iii. 454 (1841). *C. rigida*, var. *concolor*, f. *anguillata* (Drejer) Kükenth. in Engler, Pflanzenr. iv²⁰. 302 (1909).

I quite agree with Polunin, Bot. Can. East. Arct. pt. i. 130 (1940), that there is no clear line to separate *Carex anguillata* from *C. Bigelowii*, and since it is scattered through the range of the latter it is best treated as a forma. Polunin, after studying the type of *C. concolor* R. Br. Chlor. Melv. 25 (1823), preserved at the British Museum, states, with the concurrence of both Wilmott and Dandy, that it is *C. aquatilis* Wahlenb., var. *stans* (Drej.) Boott. He also notes that Simmons had already suspected as much. Phytogeographically this is as it should be. *C. Bigelowii* (*C. concolor* sensu Mackenzie) is a pronounced oxylophyte; *C. aquatilis* is often decidedly calcicolous. *C. concolor* R. Br. came from one of the limestone islands, Melville Island, of the Arctic Archipelago. In his then exhaustive Phytogeography of the Arctic American Archipelago¹, Simmons was unable to cite *C. Bigelowii* (*C. rigida* of Am. auth. perhaps not Good., and not Schrank; *C. concolor* sensu Mackenzie, not R.

¹ Lunds Univ. Årsskr. n. f. Afd. 2, ix¹⁹ (1913).

Br.) on the Archipelago from west of granitic eastern Baffin Island, making special note of its absence from the calcareous western islands; but the frequently calcicolous *C. aquatilis*, var. *stans* was cited by him from many parts of the Archipelago, including three collections from Melville Island. Although Mackenzie, in N. Am. Fl. xviii⁶. 380 (1935), gives his *C. concolor* (i. e. *C. Bigelowii*) the broad range, "Greenland to Alaska, and southward to the mountains of New Hampshire and northern New York", he had seen material only from Greenland, Ungava and Labrador to northern New England and northern New York and "Mackenzie, Alaska"; nothing from the Arctic Archipelago.

Typical *Carex Bigelowii* has linear-cylindric and elongate pistillate spikes, in its type-area (the White Mountains of New Hampshire) mostly 2–5 cm. long and 3–5 mm. thick, with the perigynia and scales rather loosely disposed, the usually long-peduncled staminate spike 1–2.5 cm. long and commonly well overtopping the pistillate. The common plant of northern Europe has the densely flowered thick-cylindric spikes mostly 1–2 cm. long and 3–7 mm. thick, the usually short staminate spike overtopped at base by the pistillate ones. It is very different from typical *C. Bigelowii*, though probably passing into it northward. It is, therefore, surprising to find in the treatment of Mackenzie, who saw species in *C. anguillata* and many other minor forms or varieties, thirty or more names of European forms placed in the synonymy of the chiefly eastern North American *C. Bigelowii* (Mackenzie's *C. concolor*). It is impossible to keep one's tongue out of his cheek as he reads Mackenzie's characterization of these European "names . . . proposed of no systematic value." It is certain that Mackenzie had never seen authentic material nor types of most of these and their citation by him does not reflect actual understanding of them. In view of the complexity of the species, I refrain from selecting the proper name for *C. rigida* Goodenow. That is a problem for the European.

C. NIGRA (L.) Reichard, var. **strictiformis** (Bailey) comb. nov. *C. vulgaris* Fries, var. *strictiformis* Bailey in Mem. Torr. Bot. Cl. i. 74 (1889). *C. rigida* Good., var. *strictiformis* (Bailey) Bailey in Journ. Bot. xxviii. 172 (1890). *C. Goodenoughii* Aschers., var. *strictiformis* (Bailey) Kükenthal in Engler, Pflanzenr. iv²⁰. 316 (1909).

The name *Carex nigra* (L.) Reichard, Fl. Moeno-Francofurtana, ii. 96 (1778) was based directly on *C. acuta* α . *nigra* L. Sp. Pl. ed. 2, ii. 1385 [1388], no. 35 (1763), where the treatment of *C. acuta* L. was identical with that of L. Sp. Pl. ed. 1, ii. 978, no. 28 (1753). *C. acuta* L. consisted of two varieties: α . *nigra*, which was *Carex nigra verna vulgaris* of Flora Lapponica, no. 330 (1737), growing “*in siccioribus*”; and β . *ruffa*, which was a tall aquatic (“*in aquosis*”). *C. nigra* (L.) Reichard antedates by seven years *C. nigra* All. Fl. Pedem. ii. 267 (1785), the name generally used for an alpine species of § *Atratae*, occurring in Europe and western Asia. *C. nigra* All., a later homonym, must be replaced either by *C. parviflora* Host (1801) or by *C. bina* Schkuhr (1801). That is for Europeans to settle; and *C. parviflora* C. A. Meyer (1831), maintained by Kükenthal, cannot be used because of *C. parviflora* Host (1801) and of *C. parviflora* Gaudin (1804). Meyer’s species apparently becomes *C. melanocephala* Turcz. (1856).

Carex nigra (L.) Reichard was revived by G. Beck (Beck von Mannagetta) in his Flora von Nieder-Österreich, i. 136 (1890). It is the same as *C. Goodenowii* J. Gay in Ann. Sci. Nat. sér. 2, xi. 191 (1839), as *C. vulgaris* Fries, Mant. 153 (1842), as *C. Goodenoughii* Asch. Fl. Brand. i. 776 (1864) and as *C. acuta* sensu Mackenzie in Bull. Torr. Bot. Cl. 1. 345 (1923) and in N. Am. Fl. xviii⁶. 388 (1935). In L. Sp. Pl. ed. 2, ii. 1388 (1763) and in later editions of the Linnean works, including Fl. Lapp. ed. 2: 265 (1792), edited and emended by Sir James Edward Smith who had the Linnean Herbarium, the identity of *C. acuta* α . *nigra* and *C. nigra verna vulgaris* was reaffirmed. Reichard drew his binomial, *C. nigra*, directly from *C. acuta* α . *nigra*; Gay, in publishing *C. Goodenowii*, cited as the first synonym *C. nigra verna vulgaris*, followed by *C. acuta* α . *nigra*; Fries, describing his *C. vulgaris*, also cited “*Carex vulgaris nigra* [changing the emphasis to ‘*vulgaris*’]. Linn. Lapp. n. 330”; and Beck von Mannagetta, reviving *C. nigra*, gave only the synonyms “L. (als Var. α . der *C. acuta*) . . . —*C. Goodennowii* Gay . . . (richtiger *C. Goodenoughii* [neither of Beck’s spellings agreeing with Gay’s original *Goodenowii*])—*C. vulgaris* Fries”. It is difficult to find any doubt concerning the identity of *C. nigra* (L.) Reichard.

Carex acuta L. (1753), having consisted of two varieties, α . *nigra* and β . *ruffa*, which soon proved to be not closely related, the first author who satisfactorily distinguished one of them as a separate species automatically determined which element should retain the name *C. acuta*. In taking out *C. nigra*, based upon *C. acuta* α . *nigra*, Reichard solved the question; there was nothing left of *C. acuta* but β . *ruffa*. When, furthermore, in Trans. Linn. Soc. ii. 203 (1794), Goodenough definitely identified *C. acuta* as the *C. gracilis* of Curtis, Flora Londinensis, and described it as a relatively large plant reaching a height of 2 feet or more, with harsh culms, with 2 or 3 staminate spikes each 1–3 inches long, with foliaceous bracts overtopping the inflorescence, and with pistillate flowering spikes pendulous, he was restricting *C. acuta* to *C. gracilis* Curtis.

Goodenough erred in citing as a synonym of *Carex acuta*, as interpreted by him, *C. acuta* β . of Flora Suecica, ed. 2, no. 857 (1755) instead of *C. acuta* α . of that work, for the two varieties, α . and β . of Species Plantarum (1753) were reversed in Flora Suecica; but Goodenow's detailed description shows all who can read his excellent Latin that he was not describing *C. nigra verna vulgaris*. However, in arguing against the good usage of European botanists for one and a half centuries, in keeping *C. acuta* L. in the sense of *C. gracilis*, the late K. K. Mackenzie, in Bull. Torr. Bot. Cl. 1. 343–345 (1923), laid his stress on the confusion prior to 1753 and upon his private dictum, that the "alpha variety" must be taken as type of a species. There is no justification for the latter argument and surely our nomenclature begins with 1753, not with 1737 or other earlier dates. The interpretation of Linnean species of 1753 should stop there, unless they depend primarily on descriptions of earlier date. If, seeking back of that for pre-Linnean (prior to 1753) meanings of names, we should insist on the ancient interpretations as more important than those of 1753 we should get into a hopeless maze. Careful and scholarly botanists have wisely decided to stop at 1753. Of course, if new light is discovered, showing that there has been serious error in identification, reconsideration is necessary. In case of the two components of *C. acuta* of 1753 there is no new information. In 1753 both elements were *C. acuta*. The withdrawal from the pair of *C. nigra* in 1778 left as

C. acuta the other member of the pair. This was clearly described in 1794 by Goodenough as true *C. acuta*. That should settle the matter. Nothing but confusion results from an attempt to disturb typifications so adequately made by those who understood what they were doing.

Carex nigra (*C. Goodenowii*) has several European varieties which are not known in America, while var. *strictiformis*, closely cespitose and tall (up to 7.5 dm.), with scattered and relatively loose pistillate spikes, is apparently confined to eastern North America. Beck von Mannagetta and Kükenthal have defined those of Europe, some of them considered endemic European species by good students of the genus. It certainly seems as if the 3½-page bibliography under the misidentified *C. acuta* in the North American Flora might well have been reduced by the omission of many scores of names of plants which are not known to occur anywhere in North America.

CAREX STYLOSA C. A. Meyer, var. **nigritella** (Drejer), stat. nov.
C. nigritella Drejer in Nat. Tidssk. iii. 450 (1841).

Although it has been the custom, ever since Kunze's uniting of the two, to treat *Carex nigritella* of Greenland, Labrador, Newfoundland and eastern Saguenay County, Quebec, as identical with *C. stylosa* of southern Alaska, there seems to be good ground for treating the plant of the North Atlantic area as varietally distinct. When he described *C. stylosa* from Unalaska, Meyer, in Mém. Acad. St. Pétersb. Sav. Étr. i. 222, t. 12 (1831), accompanied his very full description by a beautiful plate, showing the slenderly ellipsoid and subacute perigynia long-attenuate and "quasi" stipitate, the ellipsoid-obovoid achene gradually rounded at summit and with attenuate base; and the leaves were described as subrigid. Unfortunately, our old collections of *C. stylosa*, presumably containing an isotype, are all interned in Sweden so that I am now unable to examine them; but a few Alaskan sheets, most kindly sent me for study from the New York Botanical Garden, and some recent collections from there by Miss Scamman and by Mr. Erling Porsild well agree with Meyer's description and plate. They show the well developed perigynium to be slenderly ellipsoid and 3–3.5 mm. long, and mostly equaled or exceeded by the scales; whereas the more broadly obovoid perigynia of var. *nigritella* are 2–2.5 mm. long and much longer

than the scales. The achene of *C. stylosa* is as shown by Meyer; that of var. *nigritella* shorter and more rounded-oblong, shorter-stipitate, and with broadly rounded to subtruncate summit. In *C. stylosa* the foliage is harshly scabrous, in var. *nigritella* less so or nearly smooth. The inner band of the leaf-sheath in *C. stylosa* is most often friable, in herbarium-specimens usually fractured; whereas, the inner band of var. *nigritella* is more durable and usually unbroken in the old dried material.

When Drejer described his *C. nigritella* he specially contrasted it with *C. stylosa*, emphasizing the more durable inner band of the leaf-sheath and other characters not so good. Kunze, Suppl. Riedgr. 115. t. xxix, promptly reduced *C. nigritella* and practically all botanists for a century have followed his interpretation. Kunze's plate, however, showed only the Alaskan plant, with the characteristic perigynium and achene, from Sitka, and he did not illustrate *C. nigritella*. Francis Boott, following Kunze, illustrated as the southern Alaskan *C. stylosa* a plant from Greenland (*C. nigritella*), showing the short-oblong achene subtruncate at summit, with the style either erect or depressed (the latter tendency frequent in var. *nigritella*); but, as a concession to the type-region of *C. stylosa*, he added details of the Alaskan plant, with longer and ellipsoid more gradually tapering achene, as in Meyer's original plate and as in the Alaskan specimens. *C. nigritella* was beautifully shown in Fl. Danica, xiv. fasc. xl. t. mmccclxix (1843), here again with the characteristic achenes of the eastern plant, one of them shown with depressed style-base.

C. MEDIA R. Br., var. **Stevenii** (Holm), comb. nov. *C. alpina*, var. *Stevenii* Holm in Am. Journ. Sci. ser. 4, xvi. 21, 27 (1903); Fernald in RHODORA, xxxv. 223, t. 248, figs. 5 and 10 (1933). *C. VahlII*, var. *Stevenii* (Holm) Fernald in RHODORA, xxxv. 398 (1933). *C. angarae*, var. *Stevenii* (Holm) A. E. Porsild in RHODORA, xli. 204 (1939).

I fully agree with Porsild that the woodland and relatively southern *Carex angarae* Steud. (1855) is specifically distinct from the arctic-alpine plant of northern Eurasia and from Greenland to northern Newfoundland, the Shickshock Mts. of Gaspé and the northern shores of Hudson Bay. The distinctive characters were stated by me in RHODORA, l. c. 222 and 224, and then illustrated. In taking up for the woodland plant of Asia and North America the name *C. angarae* (1855) Mr. Porsild

overlooked *C. media* R. Br. in Richardson in Frankl. Journ. 750 (reprint, 22) and ed. 2: 763 (reprint, 35) (1823). Brown's species, under the synoptic heading "4. *Spicis androgynis pedunculatis*" was clear:

356. *C. media*: *spicis androgynis ternis brevissime pedunculatis sessilibusve approximatis basi masculis, stigmatibus tribus, capsulis ovato rostellatis glaberrimis squama ovata obtusiuscula longioribus*. Brown, MS. (W) [W, "wooded country from latitude 54° to 64° north"].

Prope *C. bicolore*. Br.

As to the name *C. VahlIIi* Schkuhr (1801) for the arctic-alpine plant with strongly granular-papillose short- and straight-beaked trigonous-obovoid perigynia only 2–2.5 mm. long, Dr. V. Kreczetowicz, Fl. U. S. S. R. iii. 183 (1935) points out that *C. norvegica* Retz. Fl. Scand. Prodr. 179 (1779) antedates *C. norvegica* Willd. (1801) and is identical with *C. VahlIIi* Schk. (1801). Retzius in his ed. 2: 219 (1795)—I have not seen ed. 1—gave a sufficiently clear characterization of the plant which has passed as *C. alpina* Lilj. (1798), not Schrank (1787), as *C. Halleri* Gunn. (1772) in small part only, not as to type) and as *C. VahlIIi* Schkuhr (1801). The description of Retzius and his citation of Flora Danica, t. 403, which is a crude figure of the arctic-alpine plant (Retzius said "Pl[anta] alp."), cited by Mackenzie under *C. VahlIIi*, and the further citation by Retzius of the Norwegian element of *C. Halleri* (not the Haller plant which must be taken as type of *C. Halleri*¹), leave no question that for the much named *C. Halleri* Gunn. (1772), exclusive of type, *C. alpina* Lilj. (1798), and *C. VahlIIi* Schkuhr (1801) we must, unfortunately, take up the name *C. norvegica* Retz. (1779). The maritime *C. norvegica* Willd. becomes *C. Mackenziei* V. Kreczetowicz, l. c. (1935).

C. LASIOCARPA Ehrh., var. **americana**, var. nov. (TAB. 712, FIG. 10 et 11), a var. *typica* europaea recedit bracteis vix vaginatis, squamis foemineis plerumque aristatis vel cuspidatis; perigyniis ovoideo-ellipsoideis 3–4.5 mm. longis, 1.7–2 mm. latis, rostro perbrevis dentibus 0.2–0.5 mm. longis; achenio ellipsoideo.—Peaty meadows, swales, pond-margins, bogs, etc., Newfoundland to British Columbia, south to northern New Jersey, Pennsylvania, Ohio, Indiana, Illinois, Iowa, Manitoba, Saskatchewan, Idaho and Washington. TYPE: open sphagnous bog, Argyle, Yarmouth County, Nova Scotia, July 9, 1920, Pease & Long, no. 20,519 (in Herb. Gray.).

¹ For discussion see Fernald in RHODORA, xxxv. 220, 221 (1933).

Carex lasiocarpa, var. *americana* is the transcontinental and usually very familiar plant with involute-filiform or canaliculate slender leaves which has regularly passed either as *C. filiformis*, sensu authors, not L., or as *C. lasiocarpa* Ehrh. It is beautifully illustrated in Boott, Ill. *Carex*, i. t. 132 (1858) as *C. filiformis*, Boott's plate made, not from the type-area (Sweden) of *C. filiformis* of authors, but from Rhode Island material (our FIGS. 10 and 11). It is also well illustrated in Mackenzie, N. Am. Cariceae, ii. pl. 385 (1940). In both these plates the prevailing cuspidate to aristate scale, the shape of the perigynium and its very short teeth, the outline of the achene, and the sheathless or barely sheathed lower bract are all brought out, Boott's figures of perigynia and scales here partly reproduced as FIGS. 10 and 11.

Typical *Carex lasiocarpa* of Europe and western Asia has the lowest bract either sheathless or with a tubular sheath up to 1.5 cm. long. In var. *americana* it is difficult to find more than a suggestion of a sheath. In typical Eurasian *C. lasiocarpa* the pistillate scales are much less often aristate than in the American plant. The perigynium of the Eurasian type (FIGS. 8 and 9) is more slender and longer (4–6 mm. long) and with longer teeth (0.7–1 mm. long); and its achene is more obovoid than in the American. The perigynia of typical Eurasian *C. lasiocarpa* are accurately shown in Host, Gram. i. t. 86 (1801) as *C. filiformis*—here reproduced as FIG. 9, and in Lindman, Svensk Fanerogampl. fig. 108² (1918)—here reproduced as FIG. 8.

Were true *Carex lasiocarpa*, of Europe and of Asia eastward from the Ural to Lake Baikal, and var. *americana* alone to be considered, the latter would have some claim to specific segregation. In eastern Asia, however, in Manchuria, China, Japan, etc., *C. lasiocarpa*, var. *occultans* (Franchet) Kükenthal has the perigynia (FIG. 12) as short and as short-toothed as in var. *americana*, but they are less pubescent and often longer-beaked, and the pistillate scales are more like the average run on the Eurasian plant. Var. *occultans* seems to be a variety about midway between typical *C. lasiocarpa* and var. *americana*, its perigynium (our FIG. 12) well shown in Akiyama's Consp. Caricum Jap. fig. 170 (1932); while some plants of Kamtchatka are scarcely separable from the American plant.

CAREX PALLESCENS L., var. **neogaea**, var. nov. (TAB. 712, FIG. 13-18) perigyniis apice late rotundatis erostratis ore depresso.—Meadows, grasslands, thickets and glades, Newfoundland to Ontario, south to Nova Scotia, New England, New Jersey, Pennsylvania, Ohio and Michigan. TYPE from wet clearing in spruce woods along Gander River, Glenwood, Newfoundland, July 12 and 13, 1911, *Fernald, Wiegand and Darlington*, no. 4918, in Herb. Gray.

Carex pallescens, var. *neogaea* is the common plant of eastern North America which regularly passes with us as *C. pallescens*. True *C. pallescens* L. Sp. Pl. ii. 977 (1753), with "*Habitat in Europae paludibus*", occurs over much of temperate Europe and western Asia (lacking, according to Kükenthal, in most of Arctic Europe, the Iberian Peninsula and the southernmost Mediterranean region). Its range does not connect with the North American area by way of Iceland and southern Greenland, and it is essentially unknown in eastern Asia. Realizing that long isolation without connecting colonies might have resulted in some constant differences I have tried every character. In habit, foliage and general characters of bracts, spikes, scales, perigynia and achenes the two series are similar. The better developed European material has the perigynia sometimes longer than in the American, but some of the smaller European forms show no difference from ours in their size. One apparently constant difference, one of real significance, comes out. In the Eurasian plant the perigynium (FIGS. 13-15 and 19) is gradually rounded or tapering to a definite, though extremely short, beak; in the American plant (FIGS. 16-18) there is no beak, the orifice occupying a slight depression in the broadly rounded summit. The very short but definite beak in true *C. pallescens* is shown in Host, Gram. Austr. i. t. 74, fig. 5 (1801)—our FIG. 13; and in Boott's Illustrations of the Genus Carex, iv. t. 450 (1867), figs. *a* and *b*, at right (our FIG. 14), Boott's description on p. 139 saying "perigyniis . . . saepe brevissimo abrupte rostellatis", although on the next page (presumably through inclusion of the American plant) he reversed himself and said "*Perigynium . . . saepe erostellatum*". The beak is also displayed in Reichenbach, Ic. Fl. Germ. Helv. viii. t. ccli. fig. 617; and in numerous other Old World illustrations. The perigynium of the American var. *neogaea* has had no good illustration, except for

the tiny one of the late Schuyler Mathews in Gray, Man. ed. 7, fig. 238 (1908). It has been many times accurately described: "Very obtuse . . . ; the orifice minute and entire"—Torr. Fl. N. Y. ii. 403 (1843); "wholly beakless"—Bailey in Gray, Man. ed. 6: 606 (1889); "well marked by the . . . pointless perigynia"—E. C. Howe in 48th Rep. N. Y. State Mus. 102—Repr. 64 (1896); "abruptly rounded and beakless at apex"—Mackenzie in N. Am. Fl. xviii⁶. 320 (1935). These authors had the American, not the European, plant before them; although Mackenzie cited in the synonymy of the American plant 28 names and combinations, 27 of them belonging exclusively to Old World variations not known in America, the 28th an American misapplication of the European *C. undulata* Kunze.

As to *Carex undulata* Kunze, Suppl. Riedgr. 23, t. 4, fig. 2 (1840), which became *C. pallescens*, var. *undulata* (Kunze) Reichenb. Ic. Fl. Germ. viii. 22, t. 251, fig. 618 (1846) and which was separately taken up as var. *undulata* (Kunze) Carey in Gray, Man. 552 (1848), although Reichenbach's characterization of it as "a praecedente fructu obtusiore" suggests var. *neogaea*, the original illustration of the inflorescence and the perigynium by Kunze (our FIG. 19) shows by the tapering summit that it is not ours.

In PLATE 712, FIGS. 13–16 are of *CAREX PALLESCENS* L. of Europe; FIG. 13, a perigynium, $\times 10$, from Moravia, *Domin & Krajina*, Fl. Čechos. Exsicc., no. 354; FIG. 14, perigynium, after Host; FIG. 15, perigynia after Boott. FIG. 19 is the inflorescence and a perigynium (*g*) from the original plate of *C. undulata* Kunze. FIGS. 16–18 are perigynia, $\times 10$, of var. *neogaea*: FIG. 16, from the TYPE; FIG. 17, from Grand Manan, New Brunswick, *Weatherby*, no. 5635, with persistent style projecting from orifice; FIG. 18, from Newcomb, New York, *House*, no. 7426.

CAREX DEBILIS Michx., var. ***intercursa***, var. nov. (TAB. 713, FIG. 6), a var. *typica* differt perigyniis puberulis opacis, a var. *pubera* differt squamae foemineae carina non exserta. South-eastern Virginia and eastern North Carolina. VIRGINIA: Richmond, May 9, 1894, *J. R. Churchill*; argillaceous clearing in swampy woods near Readjuster Bridge over Nottoway River, northeast of Orion, Greensville County, June 13, 1940, *Fernald & Long*, no. 12,016 (TYPE in Herb. Gray.; ISOTYPE in Herb. Phil. Acad.). NORTH CAROLINA: moist open woodland, Lake Raleigh, 3 miles south of Raleigh, April 23, 1938, *Godfrey*, no. 3706; creek-bank, Delgado, near Wilmington, April 21, 1923, *J. R. Churchill*.

Carex debilis, var. *intercursa* is exactly intermediate between typical *C. debilis*, with glabrous and lustrous perigynia, and var. *pubera* Gray, Man. ed. 5: 593 (1867). It has the puberulent and opaque perigynia of the latter, the pistillate scales of the former. In typical *C. debilis* the obtuse to acute scales (FIG. 1) usually (but not always) have the midrib evanescent toward the tip, so that the tip of the scale is commonly veinless; in var. *pubera* the midrib reaches the tip of the scale (FIG. 5) or projects as a short cusp or awn. Otherwise the only difference I am able to detect is the puberulent perigynium of var. *pubera*, a character quite variable in its intensity. Both of Judge Churchill's collections of var. *intercursa* (from Richmond and from Wilmington) and Godfrey's from Lake Raleigh were, quite naturally, distributed as var. *pubera*, while, at the time of collecting our no. 12,016, Mr. Long questioned if it might be var. *pubera*. All these plants of the Coastal Plain and the outer Piedmont have, however, the most extreme scale of *C. debilis* and they seem to be another of the numerous geographic varieties of that highly variable species.

It is most probable that var. *intercursa* is the *Carex venusta*, var. β . of Boott, Ill. Carex, i. 51 (1858), which Mackenzie includes in the synonymy of his *C. allegheniensis* (based, as to type, on *C. debilis*, var. *pubera* Gray). Boott gave no locality for his *C. venusta*, var. β . except "New [North] Carolina, Mr. Curtis". It differed from the coarser *C. venusta* (which has puberulent perigynia) in its more slender spikes with more slender perigynia and "squama lanceolata obtusa vel acuta, infima acuminata albida". That could have been either var. *pubera* or var. *intercursa*; without examining Boott's material we can only guess. Curtis collected extensively about Wilmington, where var. *intercursa* occurs, and published a list of the plants of the region; but he lived at Hillsboro in Orange County, where var. *pubera* possibly occurs.

It is somewhat disconcerting to one who has many times collected typical *Carex debilis* to read in Mackenzie's treatment in the North American Flora that it grows in "Dry woods and copses", while var. *pubera* (*C. allegheniensis*) occurs in "Dry woodlands, mostly in the mountains, Pennsylvania to North Carolina". There are only a few sheets in the Gray Herbarium

on which the habitat of var. *pubera* is indicated. These, however, suggest anything but dry woods and none are from the Alleghenies. The type was collected by Porter at Bear Meadows, Center County, Pennsylvania. Bear Meadows, Professor Herbert A. Wahl informs me, is a peat bog in southern Center County, so near the northwestern corner of Huntingdon County that old specimens may have come from either county. Professor Wahl also informs me that he has thus far been unable to locate Porter's type-station. Bear Meadows is considerably to the east of the true Allegheny Mountains. The labels in the Gray Herbarium showing the habitat of var. *pubera* (*C. allegheniensis*) are as follows: "In swamp", Takoma Park, D. C., *Painter*, no. 105 (at inner edge of Coastal Plain); "boggy meadow", Augusta Co., Virginia, *Carr*, no. 423 (separated from the Alleghenies by the Shenandoah Range); "moist ground and copses", Biltmore, North Carolina, *Biltm. Herb.* no. 205b (no part of the Alleghenies in North Carolina!); "wet slope" Tallulah Falls, Georgia, *Perry & Strahan*, no. 784 (Blue Ridge). The latter and two other collections from Georgia (Savannah, herb. Dewey; Warm Springs, *Tracy*, no. 8976) indicate that var. *pubera* extends considerably south of Mackenzie's southern limit, North Carolina. Other specimens in the Gray Herbarium, although without indication of habitat, are from well to the east of the Alleghenies: Bedford County, Virginia (eastern edge of Blue Ridge) and Raleigh, North Carolina (outer Piedmont, merging to Coastal Plain).

As to the occurrence of typical *Carex debilis* in "Dry woods", all labels in the Gray Herbarium giving habitats have been checked. The result follows: alluvial bottomland, 3; bed of dried-up stream, 2; border of pond or creek, 8; edge of woods, 1; low woods (including collection by *Mackenzie*), 4; swamps, 1; swampy woods or thicket, 8; wet roadside, 1; wet woods, 3.

Since the varieties of *Carex debilis* are not too well understood I am showing in PLATE 713 characteristic portions of pistillate spikes ($\times 5$) of the varieties I recognize.

My understanding of this complex species is summarized below.

- a. Perigynia glabrous and lustrous; scales rarely cuspidate b.
- b. Perigynia mostly overlapping, obscurely angled; pistillate spikes 1.5–6 cm. long; midribs of pistillate scales usually evanescent at tip.
Scales whitish; perigynia 6–9(–10) mm. long Var. *typica*.
Scales stramineous to pale brown; perigynia 4.5–7 mm. long.
Basal leaves 2–4 mm. broad, relatively thin; spikes loosely spreading to pendulous; perigynia stramineous to rusty, twice as long as scales Var. *Rudgei*.
Basal leaves 4–7 mm. broad, subcoriaceous; spikes stiffer, simply spreading to erect; perigynia greener, barely one third longer than scales Var. *strictior*.
- b. Perigynia mostly remotely alternate and not overlapping, firmer and more definitely trigonous; spikes 4–8 cm. long; midribs of pistillate scales sometimes excurrent; basal leaves subcoriaceous, 4–7 mm. broad Var. *interjecta*.
- a. Perigynia minutely puberulent, often more nerved, 5–9 mm. long.
Midrib of pistillate scales extending to tip or excurrent Var. *pubera*.
Midrib evanescent below tip of scale Var. *intercursa*.

C. DEBILIS Michx., var. **typica**. *C. debilis* Michx. Fl. Bor. Am. ii. 172 (1803). *C. debilis*, var. *prolixa* Bailey in Proc. Am. Acad. xxii. 105 (1886).—Low woods, thickets, swamps and clearings, Florida to Texas, north to southeastern Massachusetts, Long Island, New Jersey, Pennsylvania, Kentucky, southern Indiana and Arkansas. PLATE 713, FIG. 1.

Var. RUDGEI Bailey in Mem. Torr. Bot. Cl. i. 34 (1889). *C. tenuis* Rudge in Trans. Linn. Soc. vii. 97, pl. 9, fig. 2 (1804). *C. flexuosa* Muhl. ex Willd. Sp. Pl. iv. 297 (1805).—Open woods, thickets and meadows, Newfoundland to Ontario and Wisconsin, south to Nova Scotia, New England, Long Island, North Carolina, Tennessee and Missouri. FIG. 2.

Var. STRICTIOR Bailey in Mem. Torr. Bot. Cl. i. 34 (1889). *C. tenuis*, var. *erectior* Britton in Britt. & Brown, Ill. Fl. i. 321 (1896).—Upland woods, mostly at high altitudes (up to 1600 m.), central Maine to Vermont and Massachusetts. FIG. 3.

Var. INTERJECTA Bailey in Bull. Torr. Bot. Cl. xx. 418 (1893). *C. tenuis*, var. *interjecta* (Bailey) Britton in Britt. & Brown, Ill. Fl. i. 320 (1896).—Mostly in upland woods and clearings, mts. of N. H. to southern Michigan, south to western Connecticut, northern New Jersey, Pennsylvania and mts. of Tennessee. FIG. 4.

Var. PUBERA Gray, Man. ed. 5: 593 (1867). *C. allegheniensis* Mackenzie in N. Am. Fl. xviii⁵. 291 (1935).—Low woods and meadows, central and eastern Pennsylvania, south to Georgia, mostly east of the Alleghenies. FIG. 5.

Var. INTERCURSA Fernald, supra.—Low woods, thickets, clearings and shores, southeastern Virginia and eastern North Carolina. FIG. 6.

In PLATE 713 the photographs of portions of pistillate spikes are mostly $\times 5$. FIG. 1 is of *CAREX DEBILIS* Michx., var. *TYPICA* from east of Surry Courthouse, Virginia, *Fernald & Long*, no. 9883; FIG. 2, var. *RUDGEI* Bailey, from Yarmouth, Nova Scotia, *Bissell & Long*, no. 20,513; FIG. 3, var. *STRICTIOR* Bailey, $\times 1$ from Mt. Lafayette, New Hampshire, July 29, 1863, *Wm. Boott*; FIG. 4, var. *INTERJECTA* Bailey, from Lincoln, New Hampshire, *Fernald*, no. 11,623; FIG. 5, var. *PUBERA* Gray, from Augusta Co., Virginia, *Carr*, no. 423; FIG. 6, var. *INTERCURSA*, from the TYPE.

CAREX AMPHIBOLA Steud., var. ***rigida*** (Bailey), comb. nov. *C. grisea*, var. (?) *rigida* Bailey in Mem. Torr. Bot. Cl. i. 56 (1889).

C. AMPHIBOLA, var. ***turgida***, var. nov., perigyniis oblongo-subcylindricis turgidis 4–5.5 mm. longis 1.7–2.5 mm. latis apice subrotundatis basi rotundatis; foliis (3–) 4.5–10 mm. latis.—*C. grisea* sensu Boott, Ill. Carex, i. 34, t. 86 (1858).—Rich woods, bottomlands and swales, chiefly calcareous, western New Brunswick to southern Ontario and Minnesota, south to Massachusetts, Connecticut, Georgia, Alabama, Louisiana and eastern Texas. TYPE: open alluvial and marshy flats between Fall Creek, East Hill and Cayuga Lake, Ithaca, New York, June 15, 1914, *Wiegand & Thomas*, no. 1915 (in Herb. Gray.).

After several days of detailed study and checking of characters I am forced to consider *Carex amphibola* Steud., *C. grisea* sensu Boott and all later authors and *C. bulbostylis* Mackenzie (*C. amphibola*, var. *globosa* (Bailey) Bailey in Contrib. U. S. Nat. Herb. ii. 480 (1894), based on *C. grisea*, var. *globosa* Bailey in Gray, Man. ed. 6: 605 (1890)), one intergrading series of varieties.

There is even a grave doubt as to the exact identity of *C. amphibola*, for Steudel had mixed material. When he examined Steudel's plants, L. H. Bailey recorded "*C. amphibola* [p.] 234: *C. grisea*, var. *angustifolia*, Boott."—Bailey in Mem. Torr. Bot. Cl. i. 69 (1889). Boott's var. *angustifolia* is the southern plant with narrow leaves (mostly 1.5–4 mm. wide), relatively tight and slightly beaked, brown perigynia somewhat tapering at base and 4–4.7 mm. long by 1.4–2 mm. broad, the basal sheaths reddish-purple ("vaginis infimis foliorum purpureis"). Steudel's description was certainly of a mixture. His "culmo. . . compresso-triquetro" suggests some member of § *Laxiflorae*, that section being characterized by the easily compressed or even wing-angled soft and soon wilting culms, whereas the plant passing as *C. amphibola* has firm or almost wiry persistent culms not compressed. Steudel's "foliis . . . vix scabriusculis" is, likewise, not good for a plant (*C. amphibola*, sensu authors) with leaves scabrous on the margins and nerves. Mackenzie notes

in North American Flora, xviii⁵. 269 (1935) that "*Drummond* 437 [basis of *C. amphibola*] in the New York Botanical Garden is *Carex blanda* Dewey, and C. B. Clarke in his copy of Steudel has so marked *C. amphibola*". In deference to Bailey's identification of Steudel's own material I am temporarily retaining the name *C. amphibola*, with the hope that I may yet have an opportunity personally to see Steudel's material.

When we consider the name *Carex grisea* Wahlenberg in Svensk. Vet.-Akad. Nya Handl. xxiv. 154 (1803) there seems to be little question that he had some member of the § *Laxiflorae*. The very name *grisea* is inappropriate for the plant to which it has been generally applied. Bailey included *C. grisea* among "Wahlenberg's originals [which] do not appear to be in existence"—Mem. Torr. Bot. Cl. i. 60, 61 (1889); but it is not clear what Bailey was referring to when he went on, "The figures in Schkuhr with which Wahlenberg compares his *C. grisea* . . . are unmistakable", for Bailey did not state where Wahlenberg made such a comparison and Wahlenberg, in publishing his *C. grisea* in 1803, made no mention of Schkuhr and no comparison with any species. Furthermore, the only figures of Schkuhr's which belong with *C. grisea* sensu Bailey were published in 1806 in Schkuhr. Riedgr. Nachtrag. 69, t. K k k, fig. 141 (1806), and were said (erroneously) to be of *C. laxiflora* Lam. In fact, when Francis Boott took up the name *C. grisea* in the sense of *C. amphibola*, var. *turgida* his discussion of it was chiefly a demonstration that it could not be *C. laxiflora* Lam. Here is Wahlenberg's whole account:

85. *C. grisea*: spicis exserte pedunculatis sexfloris sparsifloris, bracteis vaginantibus longissime foliatis remotissimis squamis cuspidatis, capsulis oblongo-ovalibus triquetris acutiusculis ore integerrimo. Patria ignota est, an America borealis? In herbario Swartzii asservatur.

Just how Boott, Ill. Carex, i. 34, t. 86 (1858), came to the conclusion that Wahlenberg's *Carex grisea* was the plant described and illustrated by himself is not clear. Wahlenberg said "spikes on exserted peduncles, remotely 6-flowered"; Boott said (correctly) "spicis . . . foemineis . . . sub-9-vel 4-13-floris remotis vel superioribus 2 contiguis sessilibus vel inserte vaginatis" and again "Spicae . . . subdensiflorae". Boott's correct description of a plant with dense mostly sessile or short-

peduncled spikes up to 13-flowered and his plate showing 14 strongly imbricated perigynia on one half of a spike is not very suggestive of Wahlenberg's "spicis exsertis pedunculatis sex-floris sparsifloris". Neither does Boott's accurate account of the perigynium of *C. "grisea"* sensu Boott, "perigyniis oblongis utrinque obtusis subturgidis obtuse trigonis" or Mackenzie's "perigynia oblong-obovoid, suborbicular and slightly triangular in cross-section . . . rounded at base and apex, beakless" seem well satisfied by Wahlenberg's "capsulis oblongo-ovalibus triquetris acutiusculis". As already stated, Wahlenberg's account suggests some member of the § *Laxiflorae*, several of which are griseous and have long-exserted peduncles, 6-flowered spikes, with remote trigonous and pointed perigynia. Incidentally, the source of *C. grisea* was unknown. Until the actual type of *C. grisea* is found the name should be dropped as too doubtful.

As for the intergradation of the varieties of *Carex amphibola*, Mackenzie emphasizes the "Culms strongly purple-tinged at base" as absolute and forthwith includes in the synonymy *C. grisea*, var. (?) *rigida* Bailey. Var. *rigida*, said by its author to be "A singular plant, which I do not understand", was not understood by Mackenzie. As originally defined it was based on material from Sellersville, Pennsylvania, Faulkland, Delaware, and "Florida, Chapman", the Chapman plant "least characteristic of the three". The Sellersville specimen, originally called *C. oligocarpa*, bears the annotation by Bailey "This specimen appears to be intermediate bet. *oligocarpa* and *grisea*. It may be a stiff and broad-leaved *grisea* var. *angustifolia*". It is coarser and with broader and firmer leaves than in true *C. amphibola* and the purple in the base is pretty brown. The Faulkland material is similar to it and with brown lower sheaths, with the merest suggestion of purple at the very base (if properly turned to catch the light). The Chapman material is very similar, with too coarse and too brown-based tufts and too stiff and broad (up to 6 mm. wide) leaves for true *C. amphibola*.

C. amphibola has very slender and definitely purple bases, with relatively thin leaves only 1.5–4 mm. wide. Its close brownish perigynia taper to either end and are more definitely obtuse-angled than in the broader-ranging var. *turgida*, 4–4.7 mm. long by 1.4–2 mm. broad. It is represented in the Gray Herbarium by the following numbered specimens.

VIRGINIA: Claremont Wharf, Surry County, *Fernald & Long*, no. 9874; Carey Bridge, Southampton County, *Fernald & Long*, nos. 11,783, 11,789, 11,790 and 12,005; Courtland, Southampton County, *Fernald & Long*, no. 11,792; Emporia, Greensville County, *Fernald & Long*, no. 11,795. FLORIDA: St. Marks River, Wakulla County, *Harper*, no. 60; Hampton Springs, Taylor County, *Harper*, no. 63; Tallahassee, Leon County, *Harper*, no. 65; River Junction, *A. H. Curtiss*, no. 6401. TENNESSEE: Clarksville, Montgomery County, *E. J. Palmer*, no. 17,586 (as *C. digitalis*). ARKANSAS: Fulton, *Bush*, no. 1351. LOUISIANA: *Hale*. TEXAS: Houston, *E. Hall*, no. 742.

Var. *rigida* is coarser than true *C. amphibola*, with brown bases, rarely tinged with purple, the stiffer leaves 3–6 mm. broad, the perigynia nearly as in true *C. amphibola* or slightly larger and verging on the less inflated ones of var. *turgida*. It is commoner southeastward than true *C. amphibola* and intrudes much more upon the area of var. *turgida*. To me it is a transitional series between the two extremes. Its somewhat nondescript nature is shown by Mackenzie's marking many sheets of it "*C. amphibola*", many quite similar sheets "*C. grisea*", the latter, presumably, because he noted the "Culms brownish-tinged at base". The following, from among many sheets of specimens, I refer to var. *rigida*.

MASSACHUSETTS: Sheffield, Berkshire County, July 5, 1920, *Churchill*. CONNECTICUT: Southington, *L. Andrews*, no. 656, *Bissell*, no. 25; New Haven, 1859, *D. C. Eaton*. NEW YORK: College Point, Queens County, June 9, 1908, *Harper*; Cayuga Heights, Ithaca, *Wiegand*, no. 6072. NEW JERSEY: Harborton, Mercer County, *Benner*, no. 5633; Garden Lake, *Long*, no. 16,162. PENNSYLVANIA: Easton, June 4, 1887, *Porter*; Milford Square, Bucks County, May 27, 1922, *Fretz*; Lanape, Chester County, *Painter & Hodson*, no. 624; Sellersville, 1884, *Fretz*, (TYPE or ISOTYPE). DELAWARE: Wilmington, *E. Tatnall*; Faulkland, June 7, 1884, *Commons* (paratype). MARYLAND: Patuxent, Anne Arundel County, *Painter*, no. 1402; Cropley, Montgomery County, *Blake*, no. 10,839. DISTRICT OF COLUMBIA: Glen Echo, *C. F. Wheeler*, no. 827. VIRGINIA: Bull Run Mountains, Fauquier County, *Allard*, nos. 4713 and 4786; Big Cobbler Mountain, *Allard*, no. 7771; Indian Point, Prince George County, *Fernald & Long*, nos. 11,786 (slightly purple tone in base, but leaves up to 6 mm. wide); Claremont, *Fernald & Long*, no. 11,793; Haley's Bridge, Southampton County, *Fernald & Long*, no. 7782; north of Orion, Greensville County, *Fernald & Long*, no. 12,007. NORTH CAROLINA: Biltmore, *Biltmore Herb.* no. 5754a; south of

Durham, *Godfrey*, no. 3832; Raleigh, May, 1897, *Ashe*; Wilmington, April 21, 1923, *Churchill*. SOUTH CAROLINA: west of Myrtle Beach, *Weatherby & Griscom*, no. 16,426, FLORIDA: without stated locality, *Chapman* (paratype); Jacksonville, *A. H. Curtiss*, no. 6356; Hampton Springs, Taylor County, *Harper*, no. 62. INDIANA: Henryville, Clark County, *Hermann*, no. 6747; New Middletown, Harrison County, *Deam*, no. 27,655. TENNESSEE: Jackson, *Bain*, no. 253; Nashville, *Gattinger*. MISSISSIPPI: Starkville, May 29, 1891, *Tracy*. ILLINOIS: Bird Haven, Richland County, *Ridgway*, no. 872. MISSOURI: Ironton, May 24, 1918, *Churchill*, Butler County, *Bush*, no. 2660. TEXAS: southwest of Lufkin, Angelina County, *Cory*, no. 7922. Some originally called *C. grisea*, others *C. amphibola*, the identifications variously altered, mostly to *C. amphibola*, by Mackenzie.

Many specimens quite intermediate between *C. amphibola* vars. *rigida* and *turgida* are in the collections from Kentucky and Tennessee.

THE IDENTITY OF *CAREX LAXIFLORA* (PLATE 714).—So far as I can find the material upon which Lamarck based his *Carex laxiflora* has not been adequately discussed. The name has been hopelessly misapplied—to several different plants of § *Laxiflorae* as well as to members of other sections; and in two recent studies it has been used in quite dissimilar senses. Wiegand, RHODORA, xxvi. 195 (1922), took it up for *C. gracilescens* Steud. with “pistillate spikes . . . 7–25 mm. long . . . perigynia usually crowded . . . apex tapering but scarcely beaked, usually strongly bent or recurved”. He seems not to have studied Lamarck’s original material; if he had he would have found it closely agreeing with that author’s diagnosis and fuller account of his specimens. Lamarck quite appropriately called his species *C. laxiflora*, from the very slender and remotely flowered pistillate spikes of the more mature individuals before him. His account was as follows:

50. LAICHE à fleurs lâches, *Carex laxiflora*, *Carex spicis foemineis filiformibus axillaribus erectis, flosculis distantibus, foliis planis*. N[obis].

Ses tiges viennent en touffe, sont feuillées, & s’élèvent à la hauteur de sept à neuf pouces. Ses feuilles sont alternes, droites, graminées, planes comme celles du *Juncus pilosus*, glabres, larges de deux lignes & demie à trois lignes; les inférieures ou radicales sont plus courtes que les autres. L’épi mâle est terminal, droit, pâle ou jaunâtre, à peine long d’un pouce; il est embriqué d’écailles ovales-lancéolées, membraneuses. Les épis femelles, au nombre de trois, sont alternes, axillaires, droits, filiformes, pédonculés, longs d’un pouce; ils sont garnis de fleurs alternes, distantes, blanchâtres, à écailles mucronées & membraneuses.

Ces épis sont moins longs que les feuilles qui les accompagnent. Cette espèce bien distincte croît dans le New-York, la Pensylvanie & la Virginie. (v. s.)—Lam. Encycl. iii. 392 (1789).

Although Lamarck optimistically spoke of "this very distinct species", his material, preserved at the Muséum Nationale d'Histoire Naturelle at Paris and scarcely or barely in flower, really represents two species. In the autumn of 1934 Mr. Ludlow Griscom most kindly brought me, after his visit to Paris, photographs of the two sheets now extant of Lamarck's original specimens. One (FIGS. 1-4) is from New York, the other (FIGS. 5-7) from Virginia. They are mere culms broken off from the crown: the New York plant (FIG. 1) with a tuft of two culms, both far enough developed to show the loosened pistillate spikes; and a separate flowering culm quite like the other two. The Virginia plant (FIG. 5) is represented by a single culm barely in flower. The small ticket (FIG. 2) bearing in Lamarck's hand the name "*Carex laxiflora* Lam. dict." beside a similar one in his hand "de Virginie" has been pasted, somewhat recently, on the sheet with the latter specimen—somewhat recently, since the normal position for these labels, as shown by many photographs of Lamarck's types, is occupied by a larger label in the hand of L. H. Bailey: "*C. laxiflora* var. *intermedia* of Boott! L. H. Bailey Nov. 22, 1888". Lamarck's little labels were apparently originally loose and not attached by Lamarck himself. It was presumably by mere chance that the label marked "*C. laxiflora* Lam. dict." was attached to one sheet rather than to the other. Both the New York and Virginia plants were to Lamarck *C. laxiflora*, as they were to Bailey in 1888. Reporting on the latter, Bailey identified *C. laxiflora* with *C. heterosperma* Wahlenb. (1803) and *C. anceps* Muhl. (1805), saying "Lamarck's specimens, both from Virginia and New York, although young, are unmistakably the plant which Boott made var. *intermedia*, and I therefore revise the species that this form may appear as the type. . . . The type of *C. laxiflora* embraces slender plants, characterized by narrow leaves (usually less than $\frac{1}{4}$ in. in width), a peduncled or at least very conspicuous staminate spike, scattered pistillate spikes which are very loosely flowered and narrow ($\frac{1}{2}$ to $1\frac{1}{2}$ in. long), and very blunt perigynia".—Bailey in Mem. Torr. Bot. Cl. i. 32 (1889).

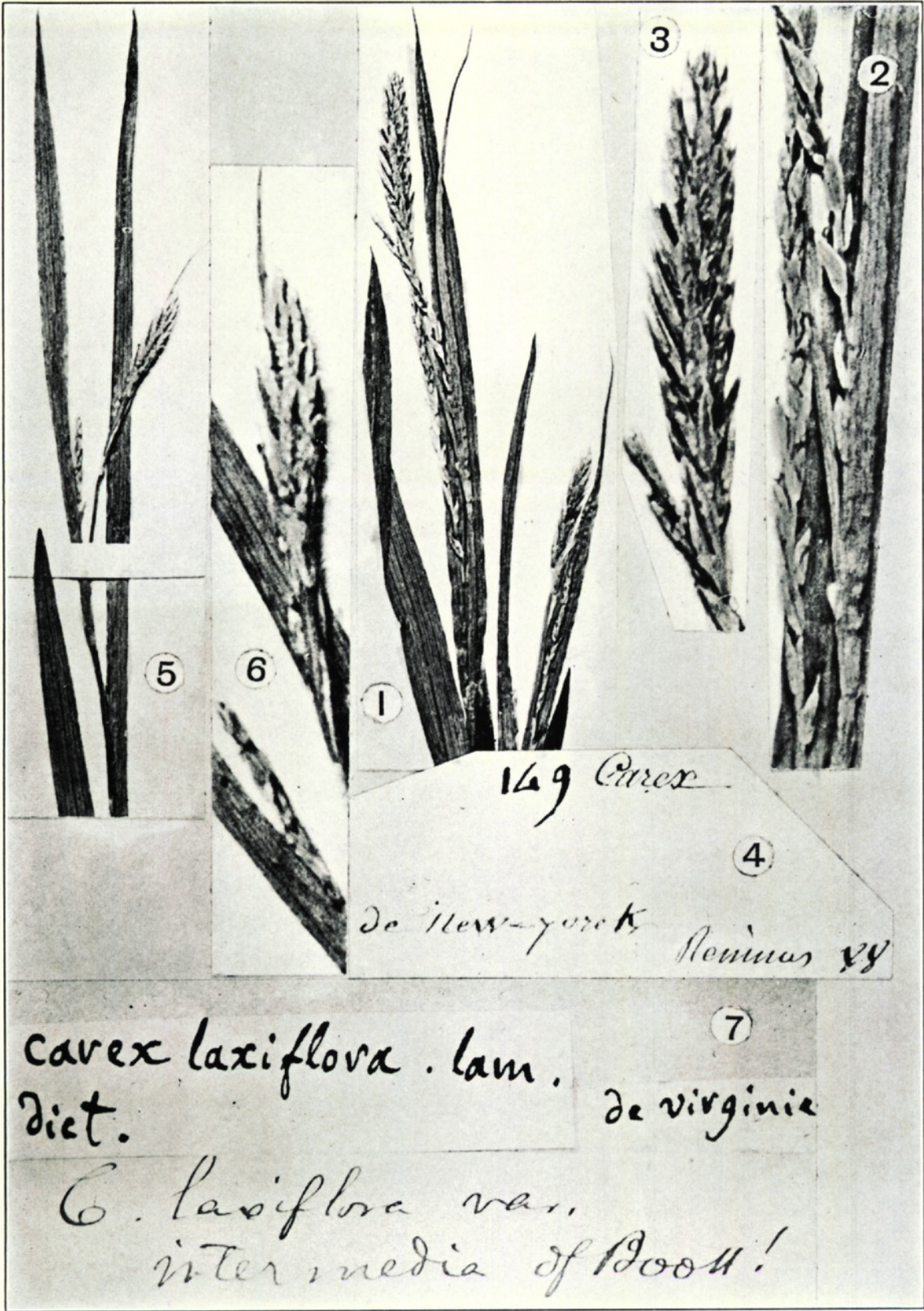


Photo. B. G. Schubert, after Cintract.

Details of Lamarck's sheet of CAREX LAXIFLORA (see text).

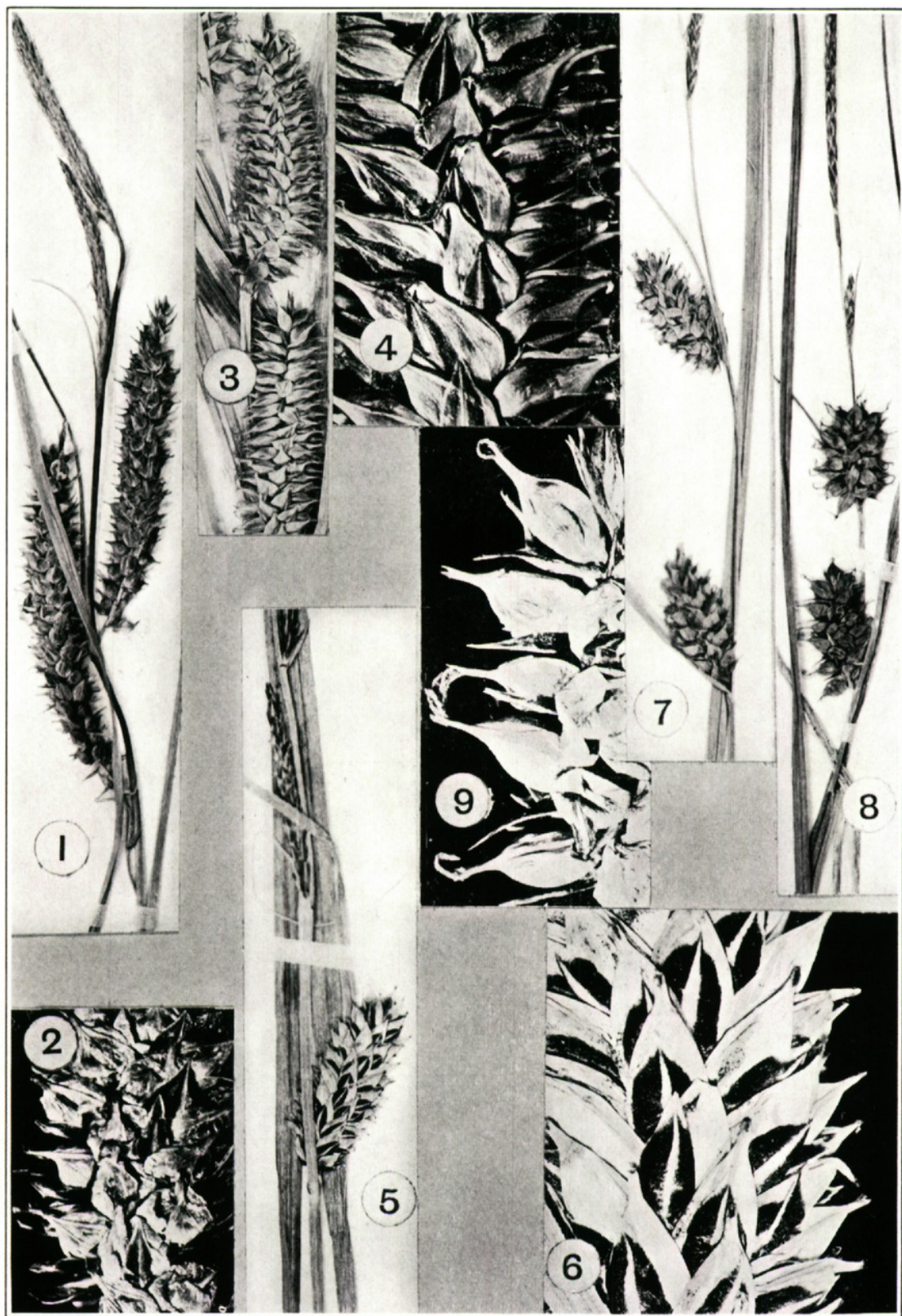


Photo. B. G. Schubert.

FIGS. 1-4, *CAREX INFLATA*: FIGS. 1 and 3, spikes $\times 1$; FIGS. 2 and 4, portions of pistillate spikes to show scales, $\times 4$. FIGS. 5 and 6, var. *ANTICOSTENSIS*: FIG. 5, portion of inflorescence, $\times 1$; FIG. 6, portion of pistillate spike, $\times 4$. FIGS. 7-9, var. *AMBIGENS*: FIGS. 7 and 8, inflorescences, $\times 1$; FIG. 9, portion of pistillate spike, $\times 4$.

The New York material of Lamarck's is certainly the same as *C. anceps* Muhl., but I see nothing in Boott's plate (Ill. i. t. 91. fig. 1) of his var. *intermedia* in it. The latter is correctly cited by Wiegand under *C. ormostachya* Wieg. in RHODORA, xxiv. 196 (1922). And, by present-day interpretations of typification, it may seem difficult to reconcile Bailey's further discussion of *C. striatula* Michx. or *C. laxiflora*, var. *striatula*, based nomenclaturally upon it. "Var. *striatula* is marked by broad leaves, a very short and inconspicuous sessile staminate spike, very short and thick pistillate spikes (rarely over $\frac{1}{2}$ in. long), the upper ones being sessile about the staminate spike", followed by his description of *C. striatula* Michx. (basis of *C. laxiflora* var. *Michauxii* Bailey, l. c.), "leaves narrow . . . ; staminate spike commonly long-peduncled; pistillate spikes scattered, . . . loosely flowered". *C. striatula* to Bailey was one plant, *C. laxiflora*, var. *striatula*, resting nomenclaturally upon it, another. This interpretation arose from a former practice of divorcing plants described from the names erroneously borrowed from earlier authors for them. When Carey described his *C. laxiflora*, var. *striatula* he described *C. blanda* Dewey, although his varietal name was based on *C. striatula* Michx., which he did not understand.

When the material which Lamarck had before him is studied it is evident that the New York specimens (FIGS. 1-4), with pistillate spikes 3, about an inch (up to 3 cm.) long, filiform, with distant flowers and mucronate scales, the staminate spike pale to yellowish, with oval-lanceolate membranous scales, and the leaves $2\frac{1}{2}$ -3 lines (5.2-6.3 mm.) broad, most closely match his description. The Virginia fragment (FIGS. 5-7) has bracteal leaves only 3-3.5 mm. (1.4-1.7 lines) broad, pistillate spikes with imbricated scales, and the scales of the staminate spike white, round-tipped and with the conspicuous green midribs not excurrent as points. The very narrow bracteal leaves, the imbricated pistillate scales and relatively short spike, and the white (chartaceous) staminate scales with rounded tips and with the vivid green midrib not excurrent, are diagnostic characters of *Carex striatula* Michx. (a photograph of Michaux's TYPE before me). The latter southern species was beautifully illustrated, as *C. laxiflora*, by Boott, l. c. t. 89. Although the bracts of

Lamarck's Virginian element of his *C. laxiflora* greatly overtop the staminate spike, whereas in well developed *C. striatula* they are commonly shorter, young flowering culms of the latter have them prolonged, such Virginia material as Allard, nos. 325 and 1468, Baldwin, no. 194 and Fernald & Griscom, no. 4339 (misidentified as *C. anceps*). In several years of intensive exploration in southeastern Virginia Mr. Long and I have only rarely found true *C. laxiflora* (*C. anceps*) there; in woodlands of New York it is abundant. In eastern Virginia *C. striatula* abounds. I, therefore, am forced to the conclusion that Lamarck's New York specimens, more closely matching his characterization, are the TYPE of his *C. laxiflora*, the Virginia material included by him with it being very young *C. striatula* Michx. I wholly concur in Bailey's decision in 1889 that the type of *C. laxiflora* is to be identified with *C. anceps* Muhl., although Bailey confused the decision by including *C. gracilescens* Steud. and some other elements. I thus quite agree with Mackenzie in the North American Flora, in taking up *C. laxiflora* in the sense of *C. anceps*. I cannot follow Wiegand in using the name in the sense of *C. gracilescens*.

In PLATE 714, figs. 1-4 are from the New York (TYPE) specimens of Lamarck's CAREX LAXIFLORA: FIG. 1, summit of larger tuft, $\times 1$; FIG. 2, pistillate spikes, $\times 3$; FIG. 3, staminate spike, $\times 3$; FIG. 4, the label, $\times 1$. Figs. 5-7 are from the young Virginia material included by Lamarck under his *C. laxiflora* (now identified as *C. striatula* Michx.): FIG. 5, summit of the specimen, $\times 1$; FIG. 6, spikes, $\times 3$; FIG. 7, labels, with portion of annotation by L. H. Bailey, $\times 1$.

C. HOSTIANA IN NORTH AMERICA.—In RHODORA xiii. 130 (1911) the late Dr. Wiegand and I pointed out that the plant of Newfoundland and Anticosti, which had passed as *C. fulva* Good. or as *C. Hornschuchiana* Hoppe, differed from the European plant in greater size of its parts. We consequently called it *C. Hornschuchiana*, var. *laurentiana*. Subsequently, finding that the latter specific name was antedated by another, we called it *C. Hostiana* DC., var. *laurentiana* Fern. & Wieg. in RHODORA, xxvi. 122 (1924). Mackenzie, however, arguing that, as a strictly North American plant, *C. Hostiana*, var. *laurentiana* should be considered a species, described it as *C. fulvescens* Mackenzie in Bull. Torr. Bot. Cl. xxxvii. 239 (1916). The two differ only in size of parts; they have the same habit and are unique in § *Extensae* in having the upper and ascending bracts

long-sheathing, the other species having the divergent upper bracts sheathless.

Most of the collections made of *C. Hostiana*, var. *laurentiana* are represented in the Gray Herbarium: Newfoundland collections of Fernald & Wiegand or of Fernald, Long and others and of Arsène, Mackenzie & Griscom, and Pease (8 nos.); Anticosti collections of John Macoun and of Victorin et al. (7 nos.). Although Mackenzie makes the perigynia of his *C. fulvescens* "5–6 mm. long", I have carefully studied the 15 numbers of it before me (one of Mackenzie & Griscom's misidentified as *C. lepidocarpa* Tausch, which has the upper bracts sheathless and divergent, instead of long-sheathed and ascending) and can find no perigynia 6 mm. long; they range from 3.5–5 mm. in length, mostly less than 5 mm., while the quite similar but usually smaller European *C. Hostiana* has them about 3 mm. long.

My reason for this note is to record typical *C. Hostiana*, with more slender habit, more slender pistillate spikes and perigynia only 3 mm. long, from Miquelon, collected in June, 1937, by M. L. Hors and sent me by Brother Louis-Arsène. The argument that *C. Hostiana* is wholly Eurasian, consequently that the Newfoundland plant, although differing from it only by an easily bridged gap in measurement of the perigynia, must be treated as a distinct species, loses its force. Both typical *C. Hostiana* and var. *laurentiana* occur along the streams and in the meadows of St. Pierre et Miquelon.

C. LACUSTRIS WEST OF THE ROCKY MOUNTAINS.—In the North American Flora, xviii⁴. 437 (1935) Mackenzie rejected from consideration the old collection of *Carex lacustris* Willd. (*C. riparia* sensu Am. auth., not W. Curtis) from Pend d'Oreille River, made by Dr. David Lyall on the Oregon Boundary Survey in 1861, with the following note:

"NOTE 2: An Idaho record for this species is based on an old specimen (Lyall in 1861, Fort Coville to Rocky Mountains) labeled as collected at Pend d'Oreille River, Idaho. This specimen was distributed from Kew and is preserved in the Gray Herbarium. This is so far out of the present known range of this species that the record is being treated as a matter of mislabeling."

Had Mackenzie taken pains to look up Dr. Lyall's report¹ he

¹ *Account of the Botanical Collections made by DAVID LYALL, M.D., R.N., F.L.S., Surgeon and Naturalist to the North American Boundary Commission. Journ. Linn. Soc., vii. 124–144 (1864).*

would have found no justification for "the record being treated as a matter of mislabeling." Here are Lyall's words: "my later and more extensive collections [the whole series collected from 1858-1861, the plants of 1861 certainly being "later collections"] . . . were retained intact . . . The necessary arrangements having been made which enabled me to repair to Kew, I immediately commenced the sorting and ticketing of the specimens in all the collections . . . The collections having been accurately . . . named, and a complete set laid into the Hookerian Herbarium, I distributed the duplicates to various public museums and botanists in Europe and North America . . .—those having been selected in which . . . they would be most beneficial to science. In doing this, I attached to every specimen a ticket, bearing the same name, locality, &c., as that attached to the specimens retained in the Herbarium at Kew". The first set of duplicates, personally labelled by Lyall, went to "Dr. Asa Gray, Cambridge University, Massachusetts", this the only set sent to America. There seems to be no reason to doubt Lyall's own label, with the name and locality in his own hand, "*Carex riparia (lacustris)* Pend Oreille River". The sheet bears the validation by Francis Boott of its identity, and an annotation of the same identification by Mackenzie. One of Lyall's sets was also sent to Berlin. This enabled Kükenthal, treating *Carex* in Engler's Pflanzenreich, to cite *C. lacustris* (as *C. riparia*, var. *lacustris*) as growing in "Idaho". Surely, if the set sent to Berlin also has *C. lacustris* from Pend d'Oreille River, just as do the sheets at Kew and at the Gray Herbarium, the possibility of mislabeling vanishes.

The occurrence west of the Rocky Mountains of species otherwise known only in the eastern States and eastern Canada is one of the most familiar phenomena of geographic distribution in temperate North America; while the occurrence in eastern North America of limited colonies of species predominantly of the Pacific Slope has been so much discussed that to those who see outside the limits of single genera the phenomenon should by this time be quite familiar. The number of species with such bicentric ranges runs into hundreds. In fact, Mackenzie himself admits such bicentric ranges in *Carex*: *C. tincta* Fernald, "Specimens examined from New Brunswick, Quebec, Maine,

New Hampshire, Vermont, western Massachusetts, western Connecticut, Alberta", with a continuous range unjustifiably implied in "New Brunswick and Maine to Alberta", to which Washington may be added; *C. projecta* Mackenz. with an unsupported continuous range implied in "Newfoundland to British Columbia" but the most western specimens seen only from "Manitoba, Minnesota, Iowa, British Columbia"; *C. abdita* Bickn. (*C. umbellata* sensu Mackenzie, not Schkuhr), with the stated continuous range "Newfoundland to British Columbia" unjustified by the cited western material: "Minnesota, Keewatin, Saskatchewan, British Columbia (Vancouver Island)"; and *C. comosa* Boott, with the bicentric range definitely recognized in "Quebec to Minnesota, and southward . . . ; . . . San Francisco Bay to Washington, and eastward . . . to Idaho".

It would be unwise for one who knows the Pend d'Oreille River only from maps to suggest where Lyall collected *Carex lacustris*. Perusal, with Dr. Hugh M. Raup, of Lyall's account indicates that he crossed the river in 1861 near Albany Falls in Bonner County, Idaho, perhaps slightly farther west, in Stevens County, Washington. Search along the river should reveal it, probably in both Idaho and Washington.

Incidentally, although Mackenzie's key and description call for perigynia of *Carex lacustris* with "Teeth of . . . beak short, 0.5 mm. long", as contrasted with other species having the teeth "0.5–3 mm. long", great care should be exercised in following his measurements. Specimens of *C. lacustris* show the teeth to range from 0.3 to 1 mm. in length!

C. INTUMESCENS Rudge, var. *FERNALDII* Bailey, forma **ventriosa**, f. nov. (PL. 713, FIG. 19–21), perigyniis ovoideis ventriosis 5–8 mm. diametro; achenio trigono-obovoideo apice rotundato.—Newfoundland to Minnesota, south to Nova Scotia, Maine, Massachusetts, Connecticut, New York, West Virginia and mts. of North Carolina. TYPE: Ripton, Vermont, July 19, 1898, *Ezra Brainerd* (in Herb. Gray.).

Carex intumescens at the northern limit of its range has the achene (FIGS. 13–21) obovoid, broadest near the summit and gradually to broadly rounded to the beak, whereas all material from the southern two thirds of the broad specific range has achenes more narrowly ellipsoid, broadest near the middle and gradually tapering to the beak. The latter is true *C. intumescens*,

described by Rudge from Carolina with "semina ovata, triquetra, glabra, acuminata." Examination of achenes of all specimens in the Gray Herbarium gives the following geographic contrast. True *C. intumescens*, with ellipsoid, acuminate achenes (FIGS. 7-12) is the only one there represented from Florida, Alabama, Mississippi, Louisiana, Texas, Georgia, South Carolina, eastern and Piedmont North Carolina, Virginia, Maryland, Delaware and New Jersey. On the other hand, the plants with obovoid achenes more gradually rounded at summit (var. *Fernaldii*, including forma *ventriosa*) are the only ones represented from Newfoundland, Saguenay County and the Gaspé Peninsula, Quebec, New Brunswick, Prince Edward Island, northern Maine, northern New Hampshire, high mountains of North Carolina, Minnesota and Manitoba. In the intermediate belt both types of achenes are found: in southwestern Quebec, 1 of true *C. intumescens*, 14 of var. *Fernaldii*; Nova Scotia, 5 against 12; southern Maine, 2 to 12; southern New Hampshire 1 to 10; Vermont, 2 to 4; Massachusetts, 10 to 6; Connecticut, 6 to 3; New York 13 to 11; Pennsylvania, 8 to 1; southern Ontario, 3 to 4; Michigan, 5 to 5; Wisconsin, 2 to 4.

That the two forms of achenes belong to geographically largely segregated varieties is clear. Typical var. *Fernaldii* has the perigynia lanceolate and barely inflated, 3-4 (-5) mm. thick (FIGS. 13, 14 and 17). Forma *ventriosa* in its distended ovoid perigynia closely resembles typical *C. intumescens* but its achenes (FIG. 21) are those of the northern var. *Fernaldii*.

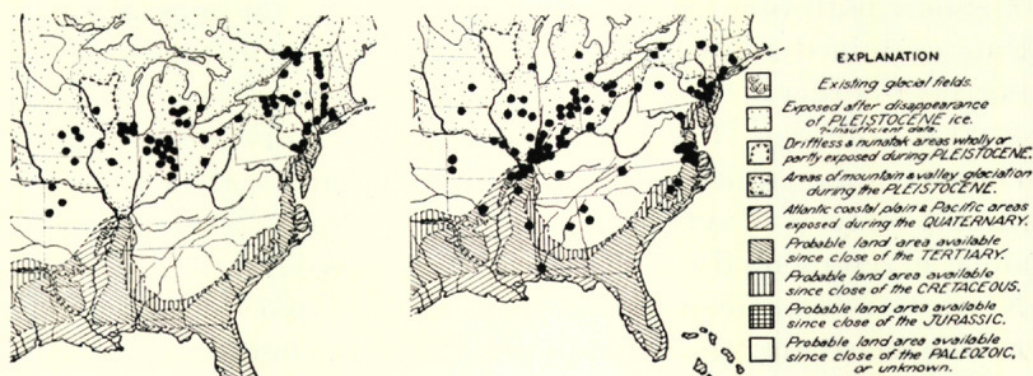
In PLATE 713, FIGS. 7-12 are of typical *CAREX INTUMESCENS* Rudge: FIG. 7, a pistillate spike, $\times 1$, from west of Fairfield, Hyde County, North Carolina, *Godfrey & Kerr*, no. 3855; FIG. 8, achene, $\times 2$, from no. 3855; FIG. 9, perigynium, $\times 2$, from north of Hoffman, Richmond County, North Carolina, *Wiegand & Manning*, no. 422; FIG. 10, achene, $\times 2$, from no. 422; FIG. 11, perigynium, $\times 2$, from Auburn, Lee County, Alabama, June 29, 1897, *Earle & Baker*; FIG. 12, achene, $\times 2$, from Auburn.

FIGS. 13-18, var. *FERNALDII* Bailey: FIG. 13, pistillate spike, $\times 1$, from the TYPE; FIG. 14, perigynium, $\times 2$, from TYPE; FIG. 15, achene, $\times 2$, from TYPE; FIG. 16, achene, $\times 2$, from Grand Cascapedia River, Quebec, July 12-15, 1905, *Williams, Collins & Fernald*; FIG. 17, perigynium, $\times 2$, from summit of Roan Mountain, North Carolina, 1878, *G. R. Vasey*; FIG. 18, achene, $\times 2$, from Roan Mountain.

FIGS. 19-21, var. *FERNALDII*, forma *VENTRIOSA*, all from TYPE: FIG. 19, pistillate spikes, $\times 1$; FIGS. 20 and 21, perigynium and achene, $\times 2$.

C. GRAYII, var. *HISPIDULA*.—Typical *Carex Grayii* Carey has the perigynium quite glabrous; var. *hispidula* Gray more or less

hispidulous, at least at base, and through half of its broad range it alone has been found, to the exclusion of the glabrous-fruited plant. In the North American Flora, xviii⁷. 464 (1935) Mackenzie reduced it outright, and in Deam, Fl. Ind. 270 (1940) Her-



Range of *CAREX GRAYII* (left); of var. *HISPIDULA* (right).

mann says: "The form known as var. *hispidula* shows no geographic segregation and doubtless does not merit even formal recognition", and he quotes another observer as stating that the same plants in different years change their perigynia from "hispidulous" . . . to "perfectly glabrous".

Familiar with glabrous-fruited *C. Grayii* in certain regions of the Northeastern States or Canada, Mr. Bayard Long and I have been impressed by its replacement on the bottomlands of southeastern Virginia by a plant which, when examined, always shows some hispidity on the fruit. At the northeastern limit of range, in the Ottawa, St. Lawrence and Chaudiere Valleys in Quebec, along Lake Champlain in Vermont, and along the Housatonic Valley in westernmost Massachusetts and adjacent Connecticut only typical *C. Grayii* has been collected. In the warm Connecticut Valley of central Connecticut, where many southern plants extend their northeastern limits, both are found. In view of this obvious difference of range in New England and southwestern Quebec and the failure of the more northern (glabrous-fruited) extreme to appear in the extensive region of calcareous bottoms in southeastern Virginia, I have borrowed all the material in the United States National Herbarium and the New York Botanical Garden, through the great kindness of Drs. Maxon, Gleason and Wittrock; and Mr. Long has checked the specimens at the Philadelphia Academy. These, with the material in the Gray

Herbarium and the herbarium of the New England Botanical Club, have all been entered on two maps (MAP 1, typical *C. Grayii*; MAP 2, var. *hispidula*). Although from the lower Connecticut and the Delaware westward to Wisconsin, Iowa and Missouri both occur, it will be noted that, in the four herbaria thus examined the glabrous-fruited plant predominates at the northern border of the specific range: 36 specimens seen from the western border of New England across New York, northwestern Pennsylvania, southern Ontario, Michigan and Wisconsin, against only 9 of var. *hispidula*. Conversely, var. *hispidula* alone is represented in these herbaria from Maryland, Virginia, North Carolina, Georgia and Alabama and from the Mississippi Embayment and confluent valleys in Mississippi, Arkansas, Missouri, Tennessee, Kentucky, southern Illinois and southernmost Indiana. In fact, the dominance of var. *hispidula* over the glabrous-fruited plant in the southern quarter of Indiana and the greater abundance in the northern third of that state of typical *C. Grayii* is displayed by the Indiana representation in the four large herbaria examined. The species or the variety is there represented from 27 counties: these collections which have been sent out, largely by Dr. Deam, should be fairly representative of the trend in the state. Enumerating the counties represented, beginning at the north and ending at the south, along the lower Ohio and Wabash Rivers, we get the following score, *g* standing for the typical glabrous-fruited plant, *h* for var. *hispidula*: Marshall *g*, Kosciusko *g*, Noble *g*, DeKalb *h*, Allen *h*, White *g*, Miami *g*, Huntington *g*, Wells *g* and *h*, Adams *h*, Jay *h*, Howard *g*, Hamilton *h*, Delaware *g*, Henry *h*, Marion *g* and *h*, Clay *h*, Union *g*, Knox *h*, Daviess *h*, Jackson *h*, Ripley *g*, Washington *h*, Gibson *h*, Posey *h*, Warrick *h*, Floyd *h*. That var. *hispidula* is, in its broad range, more southern than typical *C. Grayii* and that the latter extends farther to the northeast should be apparent. I am, therefore, forced to look upon it as meriting much more than "not . . . even formal recognition". While nomenclaturally *C. Grayii* is the type of the species, phylogenetically var. *hispidula*, less concentrated in the area invaded by Pleistocene ice, is apparently the older of the two.

THE NORTH AMERICAN VARIATIONS OF *CAREX INFLATA* (PLATES 715 and 716).—As shown by Rendle & Britten in Journ. Bot.

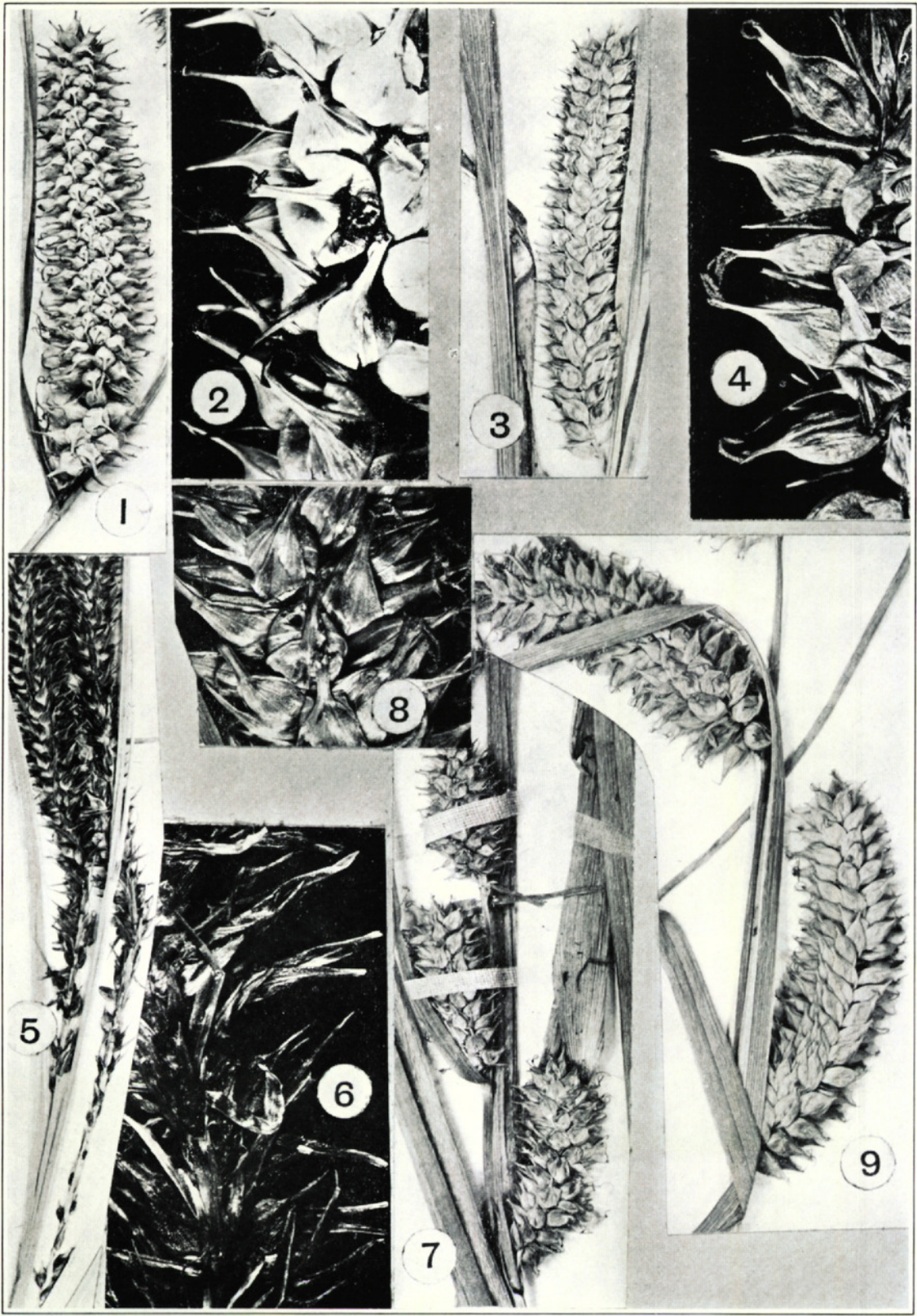


Photo. B. G. Schubert.

Variations of *CAREX INFLATA*, var. *UTRICULATA*: pistillate spikes, $\times 1$; enlargements, $\times 4$.

xliv. 444 (1907), *Carex rostrata* Stokes (1787) is antedated by *C. inflata* Hudson, Fl. Angl. 354 (1762) in part, emended in ed. 2: 412 (1778). Although the original (1762) account by Hudson included references to plants of Morison and of Ray which are not conspecific with Hudson's described plant, he emended the account in his second edition (1778), excluding the extraneous references and citing Welsh material which is positively identified with *C. rostrata* (1787). Since the elimination of the extraneous references was effected by Hudson himself and his own description was repeated in the 2nd edition and is supported by a cited specimen which is extant and authoritatively identified, there is no course open but to take up for *C. rostrata* Stokes (1787) the clearly typified *C. inflata* Hudson. This is inconvenient for those who have become familiar with the name *C. rostrata*. It was equally inconvenient when the long-used names *C. utriculata* Boott (1839) and var. *minor* Boott (1839) for the commonest American plant of the group were erroneously replaced by the earlier and chiefly Eurasian *C. rostrata*, or when our commonest American series was misidentified with typical *C. ampullacea* Gooden. (1794).

Very little North American material is satisfactorily identified with true *Carex inflata* (*C. rostrata* Stokes, *C. ampullacea* Gooden.), the 30 fat covers of North American material (fully 750 sheets) in the Gray Herbarium yielding only 29 numbers which can be forced into the typical European form of the species, these all from high-northern, alpine, subalpine or bleak habitats: in Labrador, Newfoundland, eastern Quebec, northern Nova Scotia, northern New Brunswick, northern Vermont, northern Michigan, Lake Athabasca, Mackenzie and Alaska, with a slightly thicker-spiked series, often with broader leaves, at high altitudes to Colorado and California. Otherwise, the great bulk of material from Labrador and Newfoundland to British Columbia, thence south to Delaware, District of Columbia, West Virginia, Ohio, Indiana, Wisconsin, Minnesota, South Dakota, New Mexico and California, differs in essential details from typical *C. inflata*. To be sure, the late K. K. Mackenzie, in a mood of almost unprecedented conservatism, placed all the North American material in undifferentiated "*C. rostrata*", giving as his excuse for so doing: "This is one of the most widely

distributed and most frequently collected of our sedges. Variations in vegetative characters in individual specimens are often marked, but are of no systematic value".—Mackenzie in N. Am. Fl. xviii¹⁷. 457 (1935).

Typical *Carex inflata* (PL. 715, FIGS. 1 and 2) is 3–6 dm. high, with canaliculate leaves 2–4 mm. broad, pistillate spikes rather lax and 6–8 (rarely –10) mm. thick, with short and blunt or merely acutish scales, the perigynia 3–5 mm. long. The bulk of North American plants are coarser, 0.4–1.2 m. high, with flat leaves 4–12 mm. broad, pistillate spikes denser and 1–2 cm. thick, the prolonged acuminate to aristate scales merely equaling to exceeding the perigynia, the latter 4–10 mm. long. Such plants, to the exclusion of others, occurring over two to three million square miles of temperate North America are not satisfactorily disposed of as "individual specimens". Mackenzie, thus calling everything of the kind (with spongy and obtuse-angled smooth culms and septate-nodulose leaves) simply *C. rostrata*, thus characterizes it: "culms 3–12 dm. high . . . , leaves 2–12 mm. wide, flat . . . ; pistillate spikes 1–1.5 [misprint for 1–15] cm. long, 6–20 mm. wide . . . ; scales long-acuminate, varying to rough-awned or acute . . . ; perigynia . . . 3.5–8 mm. long"—these dimensions apparently taken over, with little change, from Kükenthal's account of *C. rostrata*, var. *utriculata* (the common American plant).

How much more inclusive than the description of true *C. rostrata* of Kükenthal's treatment in Engler, Pflanzen. iv²⁰. 720 (1909), a plant recognized by him only from "Nord und Mittel-Europa . . . In Südeuropa selten und mehr in den Gebirgen . . . Asien: Türkisch Armenien . . . ; Lazistan . . . ; Sibirien, bis zur Lena . . . und Baikalien. Westhimalaya . . . Südwestgrönland": "Culmus 10–60 cm altus . . . Folia . . . 2–3 mm lata canaliculata . . . Spiculae . . . ♀ cylindricae 3–5 cm. longae 6–8 mm latae . . . Squamae . . . subacutae . . . Utriculi . . . 4–5 mm longi".

By Kükenthal all American material (except from southern Greenland) was put into the inclusive *Carex rostrata*, var. *utriculata* (Boott) Bailey, with "Culms 90–100 cm altus . . . Folia 4–9 mm lata plana. Spiculis . . . ♀ crassiores 1–1½



Fernald, Merritt Lyndon. 1942. "CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY—NO. CXLIV: CRITICAL NOTES ON CAREX." *Rhodora* 44, 281–331.

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